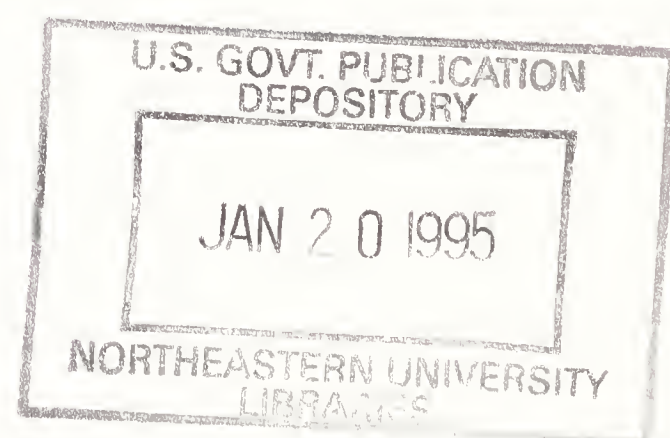


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Introduction

This volume is the twenty-first in a continuing series of compilations presenting abstracts and indexes of current Antarctic literature published since 1962. A companion volume to the series, *Antarctic Bibliography; 1951–1961*, extends the coverage retrospectively.

The material has been compiled over a period of 12 months; the cut-off date for inclusion in this volume was December 1993. To provide current awareness, the abstracts have also been distributed as 12 monthly bulletins under the title *Current Antarctic Literature*. The bulletins are generated from a computerized database which is also used in producing this cumulated listing and the indexes.

The present volume contains abstracts numbered from 47,377 to 49,497; these first appeared in issues no. 245 through 257 of *Current Antarctic Literature*. The first five volumes each contained 2,000 abstracts. Thus, items 1–2,000 appeared in volume 1 (published in 1965), items 2,001–4,000 in volume 2 (1966), items 4,001–6,000 in volume 3 (1968), items 6,001–8,000 in volume 4 (1970), and items 8,001–10,000 in volume 5 (1971). Volume 6 (1973) contained items 10,001–12,244, volume 7 (1974) items 12,245–14,447, volume 8 (1976) items 14,448–16,899, volume 9 (1977) items 16,900–19,248, volume 10 (1979) items 19,249–21,721, volume 11 (1980) items 21,722–24,083, volume 12 (1982) items 24,084–26,452, volume 13 (1983) items 26,453–28,961, volume 14 (1985) items 28,962–31,756, volume 15 (1986) items 31,757–34,660, volume 16 (1988) items 34,661–37,522, volume 17 (1989) items 37,523–40,798, volume 18 (1990) items 40,799–42,875, volume 19 (1991) items 42,876–45,062, and volume 20 (1993) items 45,063–47,376.

The material is arranged in sections representing thirteen subject categories (see table of contents). Items that apply to two or more categories are listed in one section only and cross-referenced at the end of the other pertinent sections. Because of this scheme of arrangement, some items dealing with the same subject (from different aspects) will be found in two different categories; e.g. some papers on marine sediments may be found in Section E (Geological Sciences), and others in J (Oceanography). Within each section, abstracts are arranged by accession number; the indexes are keyed to these numbers.

Foreign-language titles are given in English translation first, with the original title following in brackets. Transliteration of Cyrillic and romanization of oriental languages follow the Library of Congress systems. Some of the citations are followed by library call numbers, preceded by the library symbols commonly used in union catalogs.

As a rule, the abstracts are informative rather than descriptive, but no attempt is made to verify or critically evaluate the author's statements or conclusions. Author abstracts are either used unchanged or modified for the sake of brevity or conformity to guidelines adopted for this bibliography.

Four indexes are provided: (1) an author index that includes coauthors (anonymous journal articles are referred to under the journal name); (2) a subject index that occasionally extends to two levels of subheadings and contains cross-references; (3) a geographic index to names of places, stations, and geographic features as approved by the U.S. Board on Geographic Names; and (4) a grantee index to names of organizations or institutions that received financial support from the National Science Foundation for work that resulted in publications abstracted in the volume. In each index, entries are cited by a letter, indicating the subject category, followed by the accession number: for example, B-42469 refers to section B, Biological Sciences, item number 42469.

Although the majority of the publications abstracted are in the collections of the Library of Congress, many significant items were lent by or exchanged with other institutions, made available by the Office of Polar Programs of the National Science Foundation, or received as review copies or reprints directly from publishers and authors. Because they contribute to more current and complete coverage, review copies and reprints are especially valuable, and publishers and authors are encouraged to send them to the Library of Congress, Science and Technology Division, Cold Regions Bibliography Project, Washington, D.C. 20540, U.S.A.

Requests for photoreproductions of documents cited in this bibliography, except material protected by copyright, should be directed to the Library of Congress, Photoduplication Service, Dept. C-177, 10 First Street SE, Washington, D.C. 20540. U.S. government or government-sponsored technical reports may, in most cases, be obtained from the National Technical Information Service, Springfield, VA 22151. For such reports, NTIS order numbers are usually included in the bibliographic citation.

Stuart G. Hibben, *Head*
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Science and Technology Division
Library of Congress

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A. GENERAL

A-47386

Colacino, M., **Perspectives of the atmospheric physics researches in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.7-16.

The SCAR meeting held in S. Paulo, Brazil, July 15-21, 1990, is seen as having offered a good opportunity for a critical analysis of the state of the art of different, already developed investigations, and an evaluation of emerging trends of activities, at an international level, in the field of atmospheric physics. The main programs discussed at the meeting are reviewed, together with operational proposals for the installation of new antarctic bases. Italian antarctic programs in existence, and plans for future projects, are summarized.

A-47401

Carlesi, C., Ramorino, M.C., Rossi, L., **South-Pole: the Italian system for antarctic data exchange**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.179-184, 3 refs.

At the end of the 5-year preliminary phase of the Italian National Program for Antarctic Research, a new government law is under study for permanent financial support of antarctic research. It is proposed that all data of past and future expeditions be collected in a national database system where they could be shared with the entire national scientific community. Such a multidisciplinary, integrated database system, as the Italian antarctic data exchange project named South-Pole, is described.

A-47503

New Zealand. Ministry of External Relations and Trade, **New Zealand Antarctic Programme 1992/93**, Christchurch, 1992, 46p.

The 1992-1993 New Zealand antarctic program will involve some 226 scientists, base support and field staff. In total, there will be 50 events undertaken with most of the scientific activity being conducted in and around Ross I., McMurdo Sound and the Dry Valleys. The research organizations involved in the program are listed, and 21 projects, covering many disciplines, are outlined.

A-47504

New Zealand Antarctic Society, **Antarctic**, Vol.12, No.6, Christchurch, [1991], p.170-208.

Research activities carried out by New Zealand, Australia, France, Poland, United Kingdom, United States and the USSR are outlined. The following is covered: the 1991-1992 summer program at Scott Base and McMurdo Station, which will focus on global climate issues with continued investigations of the ozone layer; the tasks of the team working for the Antarctic Heritage Trust on Ross I.; the funding for the Australian program, increased by \$5.4 million from the previous year, for 136 research projects to be undertaken in 1991-1992; the mounting speculations for a French base in the continental interior; the 15th Polish Antarctic Expedition, which should conclude in Mar. 1992; the new base at Halley and airstrip at Rothera, to be ready for the 1991-92 season; the BAS air, field and ship operations, and activities at BAS stations; a United States mercy flight into antarctic midwinter darkness to rescue a seriously ill New Zealander from Scott Base for hospital treatment at Christchurch; a proposal for new National Science Foundation headquarters; and the entrapment of

Mikhail Somov 30 nautical miles off the coast from Molodezhnaya Station. News items concern South Georgia and Campbell islands, whaling, the Antarctic Treaty, the Bahia Paraiso, and developments at the International Antarctic Centre.

A-47511

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol.7, No.6, 1992, p.40-47, In Italian.

A detailed account of a joint U.S.-Russian research program carried out on a drifting station in the Weddell Sea, and of the activities involved in the evacuation from the ice platform of personnel and equipment at the end of the 4-month, 400-mile mission, is given. Also presented is a summary of the Finnish antarctic research program carried out at the Aboa Station since its inauguration in Jan. 1989.

A-47515

Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992, Lay, L.B., ed, Everett, L.T., ed, **International sharing of polar information resources**, Ohio State University. Byrd Polar Research Center. BPRC report, 1992 No.4, 371p., Refs. passim. For selected papers see 47-1394 through 47-1410 or A-47516 through A-47519, A-47521, A-47522 and B-47520.

This is a collection of 44 papers, 7 of which are pertinent to Antarctica, presented at the 14th Polar Libraries Colloquy held in Columbus, Ohio, on May 3-7, 1992. One of the goals of the Colloquy was to share information on current international initiatives which aid in the bibliographic control of polar literature. The Arctic and Antarctic Regions CD-ROM and the modernization of the Cold Regions Bibliography Project and the Antarctic Bibliography are examined in great detail.

A-47516

Mills, W., **Contrasts in coverage: an examination of the polar bibliographic data bases on the NISC Arctic and Antarctic Regions CD-ROM**, Ohio State University. Byrd Polar Research Center. BPRC report, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.56-78.

With the launch of the NISC Arctic and Antarctic Regions CD-ROM, the polar community has been confronted with an apparent profusion of polar bibliographic databases. This paper compares and contrasts geographic and subject coverage of the various databases, suggesting that when examined in detail, they are considerably less alike than a more cursory inspection might suggest. (Auth.)

A-47517

Hibben, S.G., **Modernization of the Cold Regions bibliographies at the Library of Congress**, Ohio State University. Byrd Polar Research Center. BPRC report, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.81-87.

After a recent review of the Cold Regions bibliography production, the National Science Foundation (NSF) and Cold Regions Re-

search and Engineering Laboratory (CRREL) sponsors have approved a plan for modernizing the process. The plan calls for updated hardware and software, an independent host computer, and real-time access for users. A new software system has been designed and ordered, and an interim upgrading of the citation input method is being adopted. The overall modernization plan is scheduled to be completed by 1994. (Auth.)

A-47518

Headland, R.K., **Archival and other data for an antarctic chronology**, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.164-179, Refs. p.177-179.

The many sources of data used in compiling a chronology of antarctic exploration and in maintaining the computer records are discussed and selected examples given. These sources are exceedingly diverse: artifacts (inscriptions on remote islands, e.g. sealers' graves), archival sources (manuscript journals and the latest exchanges of information under the Antarctic Treaty), and various published items. Ancient and modern archival materials from the Scott Polar Research Institute's sources were essential for the work. The use of the early records in modern research and some of the principles adopted to define the regions involved are also described. (Auth.)

A-47519

Walton, D.W.H., **Contribution of SCAR to antarctic research**, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.217-228, 39 refs.

A brief history of the origins of the Scientific Committee for Antarctic Research (SCAR) and its remit is followed by an examination of the range of publications produced. The literature is divided into four groups—serials, symposia, reports or monographs, and others. The place of each in current antarctic scientific information is examined. Inadequacies in the existing framework for public circulation of SCAR information are discussed. A list of SCAR publications is provided. (Auth.)

A-47521

Guthridge, G.G., **NSF's role in polar information**, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.243-249.

As manager of the U.S. Antarctic Program, since 1960 the National Science Foundation (NSF) has served as clearinghouse and source of antarctic information in governmental and nongovernmental organizations. In 1978 the Antarctic Conservation Act added information and education assignments. NSF's arctic information assignment began in 1968 with its tasking to chair the Interagency Arctic Research Coordinating Committee; that committee was abolished in 1978. After 1984 NSF was assigned to head the Interagency Arctic Research Policy Committee, which also has information tasks. To help meet these assignments the Foundation publishes two journals and additional special reports devoted to arctic and antarctic research; supports translations, a monograph series, and bibliographies; and produces publications and audio-visual products to meet needs of specialists and the broader public. Each year it handles approximately 4,000 inquiries about polar regions. It awards grants and contracts to U.S. institutions for projects to develop or improve polar information. (Auth.)

A-47522

Phillips, C., **Information acquisition and use by antarctic scientists: a study conducted at the British Antarctic Survey**, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.317-324, 1 ref.

A survey of British Antarctic Survey scientists was conducted to assess the relative importance to them of various information sources—e.g. BAS and other libraries, current awareness journals, the Arctic and Antarctic Regions CD-ROM, on-line searches, and personal communications from other scientists. Also investigated, by means of a citation study, was the relative importance of antarctic and non-antarctic literature in antarctic research. The implications of the findings for library service provision to antarctic scientists are discussed. (Auth.)

A-47576

Holmes, N., ed, **1991/92 New Zealand Antarctic Research Programme review**, *New Zealand antarctic record*, 1992 12(1), 46p.

This edition of the New Zealand antarctic record contains short reports of the projects which made up the 1991-1992 New Zealand Antarctic Research Programme (NZARP). The 1991-1992 program was smaller than previous years, but it included a great diversity in research activities, covering such disciplines as biology, geology, ice and snow, observatory programs, and physical and atmospheric sciences.

A-47582

Vovk, V.IA., **Work of the wintering personnel of the 32nd Soviet Antarctic Expedition** [Rabota zimovochnogo sostava Tridtsat'vtoř sovetskoř antarkticheskoř ekspeditsii], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyř biulleten'*, 1991 No.115, p.5-9, In Russian.

A summary is given of the multidisciplinary operations of the 32nd Soviet Antarctic Expedition, carried out at 7 Soviet stations by 347 wintering-over participants, during 1987. A table is presented showing name of station, the field of activity (mainly meteorology, terrestrial physics, glaciology and biomedicine) and the type of research performed.

A-47601

Melander, O., ed, Carlsson, M.L., ed, **Swedish Antarctic Research Programme 1991/92; a cruise report**, Stockholm, Swedish Polar Research Secretariat, 1992, 114p., Refs. passim.

The Swedish Antarctic Research Programme (SWEDARP) 1991/92 consisted of a variety of research projects in three different areas with three research parties. The destination of 19 of the participants in SWEDARP 1991/92 was Queen Maud Land and the two Swedish stations Svea and Wasa that were established in 1988 and 1989, respectively. A second party of SWEDARP 1991/92, with 2 participants, visited Livingston I. to sample lake sediments. The third party of SWEDARP 1991/92 went to South Georgia. This report contains a preliminary account of a number of scientific studies that will be reported in detail in the appropriate scientific journals. The aim of the report is to present an overview of what has been achieved and to indicate whom to contact for further information.

A-47604

U.S. National Science Foundation, **Antarctic Journal of the United States**, Vol.27, No.4, Washington, D.C., 1992, 23p.

This issue begins with a discussion on the 1992 ozone depletion as a possible response to the Mount Pinatubo eruption in 1991, with

a review of the findings and opposing theories on the subject, and the conclusion that until all observations are recorded and analyzed, the question remains unresolved. This is followed by an article cited as providing a good example of the effect of ozone depletion on the antarctic food chain. Some of the additional information provided in this issue includes the new requirements by the National Science Foundation for waste management and environmental assessment in Antarctica, with waste-minimization guidance and guidelines for personal item selection; the U.S. Senate endorsement of the environmental protocol; the details and the conclusion of a joint U.S.-Russian investigation in the Weddell Sea; the C-5 Galaxy air transport support to U.S. scientists in Antarctica; the announcement of the online availability of the Antarctic Bibliography; and weather summaries for McMurdo, Palmer and Amundsen-Scott for the period Aug. through Oct., 1992.

A-47629

Étienne, J.L., Dumont, E., Richez, V.C., **Transantarctica: traversing the last continent** [Transantarctica: la traversée du dernier continent], Paris, Éditions Robert Laffont, 1990, 295p., In French.

DLC G850.I58E85

This is a day-to-day account of an international expedition across Antarctica, beginning at Seal Nunataks, the Antarctic Peninsula, on July 28, 1989, and ending at Mirny Station on Mar. 3, 1990. General information on Antarctica, and the logistics of the expedition, are presented in an appendix. Photographs of the local scenery are included.

A-47630

Brown, P., **Last wilderness: eighty days in Antarctica**, London, Hutchinson, 1991, 250p.

DLC TD171.5.A6B76

The story of the 1988-1989 Greenpeace expedition, the people involved in it, and issues concerning the conservation and protection of antarctic environment are examined from a political, scientific, and economic point of view.

A-47650

Qin, D.H., **Achievement and its standing of researches of international antarctic glaciology—report on SCAR International Conference on Antarctic Science**, *Journal of glaciology and geocryology*, June 1992 14(2), p.178-183, In Chinese.

The 1st International Conference on Antarctic Science, Bremen, Germany, Sep. 22-27, 1991, sponsored by SCAR (Scientific Committee on Antarctic Research) with the Alfred Wegener Institute for Polar and Marine Research, is reviewed. 335 scientists from 27 countries attended. Main topics included past climatic changes recorded in ice cores, and studies of antarctic ice sheets, ice shelves, and sea ice as factors in the global climate and as indicators of global warming. It is suggested that such studies are also important for the IGBP (International Geosphere-Biosphere Programme) of SCAR.

A-47731

Parfit, M., **Reclaiming a lost antarctic base**, *National geographic*, Mar. 1993 183(3), p.110-126.

In text and photographs, both current and from an earlier time, the tale of East Base on Stonington I. is recounted. East Base was the first U.S. base on Antarctica, built as part of the expedition led by Richard Black and Finn Ronne in 1940. The base was hastily evacuated as the U. S. joined the military effort of WWII. In 1946 Ronne put together a private expedition of 23 members including the first two women to winter in Antarctica, his wife Edith "Jackie" Ronne and Jennie Darlington, wife of the expedition pilot Harry Darlington. Ronne's team arrived early in 1947 for one more year of exploration. It was the task of the present group to repair as much

of the earlier construction as was possible, to preserve as much of the matériel as was salvageable, and to place these things in exhibits in the buildings. The tale is supplemented by photographs of the 1940-1941 and the 1947-1948 periods, and anecdotes taken from extant writings by expeditioners and from conversations with those who still survive.

A-47741

Paech, H.J., **Overview of antarctic research by the DDR, 1959-1990** [Die DDR-antarktischforschung: eine Retrospektive], *Polarforschung*, 1990 (Publ. 1992) 60(3), p.197-218, In German with English summary. Refs.p.213-218.

A brief overview on the antarctic research activities (1959-1990) of the German Democratic Republic (GDR) is given. In this period the political background is characterized by a hesitating attitude of the governmental institutions, such that it was not until 1987 that the autonomous station *Georg Forster* could be ordered. The logistic support and scientific cooperation of the Soviet Antarctic Expedition (SAE) were of great importance. Scientific research covers meteorology, (particularly ozone studies), ionospheric research, hydrology and palaeoglaciology by isotope studies, geography, geodesy, biology, medicine, geology, gravimetry and geomagnetics. (Auth.)

A-47779

U.S. Marine Mammal Commission, **Annual report to Congress, 1992**, Washington, D.C., 1993, 226p., Refs. p.219-226.

Background information and activities carried out by the Commission in 1992, with respect to conservation and protection of marine mammals in the southern ocean, are described in Ch. 5 of this report, pages 134 through 143. The following is discussed: the Antarctic Treaty Protocol on Environmental Protection; the first meeting of experts on environmental monitoring in Antarctica; the 17th Antarctic Treaty Consultative Meeting; the National Academy of Sciences study of the effects of antarctic policy on antarctic science; and activities related to marine living resources.

A-47802

Biagioni, S., Carlesi, C., Ramorino, M.C., Rossi, L., **South Pole: a progress report on the Italian system for antarctic data exchange**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.295-300, 3 refs.

Phase 1 of the project concerning an Italian antarctic data exchange system (the South Pole project) is reported to be close to an end, and soon a directory of the available antarctic data will be accessible via a computer network. Some data concerning the Italian research in Antarctica, and a short description of the global project for data exchange, are reported in this paper. (Auth.)

A-47889

Birkenmajer, K., **Report on the Polish geological investigations in West Antarctica, 1990/91**, *Polish polar research*, 1991 12(3), p.369-390, With Polish summary. 38 refs.

Geological investigations of the 4th Polish Geodynamic Expedition to West Antarctica, summer 1990/91, covered the following topics: volcanological studies and mapping at Deception I.; stratigraphic, palaeontological and sedimentological studies, and mapping of Tertiary glacial and glacio-marine strata on King George I.; sedimentological and mesostructural studies, and mapping at Hurd Peninsula, Livingston I.; and palaeontological sampling of Jurassic (Mount Flora Formation) and Trinity Peninsula Group deposits at Hope Bay, Trinity Peninsula. (Auth.)

A-47911

Rudge, C., ed, **1988/89 New Zealand Antarctic Research Programme review**, *New Zealand antarctic record*, 1989 9(3), 45p.

This edition of the New Zealand antarctic record contains short reports of the projects which made up the 1988-1989 New Zealand Antarctic Research Programme (NZARP). The research activities covered biology, geodesy and geographic information, geology, ice and snow, observatory programs, ocean sciences, physical and atmospheric sciences, solid earth geophysics, and general topics. An author index and a guide to authors are included.

A-47918

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol.7, No.10, Oct. 1992, p.64-70, In Italian.

This issue contains short news items concerning the following: a one-man ski traverse expedition to the South Pole, scheduled to leave Berkner I. in Nov. 1992; new satellite telecommunication links between the Scott Base and New Zealand; an International Labor Bureau claim of infringement of the rights of foreign seamen sailing to the Kerguelen Is. on French ships; the closing of Russian antarctic stations; a French project to install a permanent station on Kerguelen Is.; the use of krypton in dating polar ice; the patrolling operations of the French ship *Albatross* in the TAAF area; and the ship *Fram*, which was under the command of Roald Amundsen during his 1911 expedition to the South Pole.

A-47925

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno**, Vol.11, No.2, Oct. 1992, 40p., In Spanish. Refs. passim. For selected papers see A-47926, A-47930, G-47927, I-47928 and M-47929.

This bulletin reviews the following: the discovery of a human skull on Cape Shirreff; various types of antarctic architecture; the role of aerosols in ozone depletion; Antarctic Treaty Consultative Parties meetings between 1961 and 1992; Chile's position regarding antarctic tourism; national activities, including the signing of a document by the Army, INACH and a university to install facilities for marine research at the Arturo Prat Station; an agreement between INACH and the Army concerning a geographic project on King George I.; international activities, including details of the 3rd meeting of administrators of antarctic Latin-American programs, and the 22nd SCAR meeting. The bulletin concludes with news items regarding activities at INACH, and a detailed account of the activities discussed during the 16th Antarctic Treaty Consultative Meeting held in Bonn, Oct.7-18, 1991.

A-47926

Torres N., D., **Indigenous skull on Cape Shirreff: a study of developments** [Cráneo indígena en cabo Shirreff?: Un estudio en desarrollo], *Boletín antártico chileno*, Oct. 1992 11(2), p.2-6, In Spanish. 13 refs.

Evidence of sealing activities on Cape Shirreff, such as wood remains from ancient ships and barrels, and the discovery of a human skull on one of the Cape's beaches, are discussed. Events surrounding the discovery of the skull, and various possibilities accounting for its presence at that particular location, are examined. It is proposed that the entire region of Cape Shirreff and vicinity be designated as a historic preservation area.

A-47930

Pinochet de la Barra, O., **Antarctic tourism: Chile's position** [Turismo en Antártica: la posición de Chile], *Boletín antártico chileno*, Oct. 1992 11(2), p.17-19, In Spanish.

After a brief review of the tectonic and historic features of Antarctica, a "new stage" is considered, which includes the signing of the Antarctic Treaty environmental protocol, the development of antarctic tourism, and Chile's participation in facilitating the latter in a controlled, environmentally responsible, and organized fashion.

A-47958

Australia. Antarctic Division, **ANARE news**, No.71/72, Kingston, Tasmania, 1993, 55p.

The beginning feature presented in this issue deals with Australia's antarctic huskies, whose bloodlines can be traced back to the 1940s, and their removal from Antarctica in compliance with Clause 2 of Article 4 of the "Madrid Protocol". It is followed by a review of geological, biological, geophysical and meteorological research in the Prince Charles Mountains, with details on the 1991-1992 summer expedition and the PCM field training program. The science news items cover an Australian-US study on the aurora, the ozone depletion, a fossil discovery in south Victoria Land, a southern ocean seabird prey study, Australian-Italian joint programs, the Prydz Bay seafloor, antarctic astronomy, and science grants for 1992-1993. Other information includes ANARE voyage schedule for 1992-1993, news items from Australian stations, new features in the Australian antarctic policy, review of recent publications, weather summaries for May-Oct. 1992 at Mawson, Davis, Casey and Macquarie I., and a 1992-1993 chronology of conferences and symposia and Australian antarctic operations.

A-47960

Scientific Committee on Antarctic Research, **SCAR report No.9**, Aug. 1992, Cambridge, Scott Polar Research Institute, 15p.

In Apr. 1991, principal geoscientists from research groups in 11 countries that have collected nearly all offshore antarctic multichannel seismic-reflection (MCS) data met at a workshop in Oslo, Norway to discuss issues and procedures regarding the release and dissemination of these data. A consensus decision was made to recommend implementation of an antarctic seismic data library system (SDLS) for cooperative research under the auspices of SCAR (ANTOSTRAT project). In June 1991, the SCAR Executive Committee formally accepted the SDLS as a SCAR initiative, as recommended. In concept, the SDLS is an intermediate step between data collectors and World Data Centers. In practice, the SDLS will foster research objectives by having branch libraries located around the world at research institutions that have collected and contributed antarctic MCS data. Implementation of the library system will begin by late 1991. CD-ROM technology now used by the US Geological Survey will be used for dissemination of digital MCS data to SDLS branches. Costs for the SDLS will be paid by the data collectors and the library users. (Auth. mod.)

A-47961

Italy. Consiglio Nazionale delle Ricerche, **Ambiente Antartide**, Jan. 28, 1993, No.5, Rome, 1993, 30p., In Italian.

This issue contains the following items of interest: the outline of a scientific and technological program, to be carried out at Dome C, based on an agreement of cooperation between Italy and France; highlights of a meeting of Italian, Russian and German scientists, held in Florence in May, 1992, to discuss the Airborne Polar Experiment project (APE) and the possibility of using the Russian aircraft "Geophysica" and "Iliushin 18" in polar atmospheric research; a list of recommendations for the selection of ships suitable for oceanographic and geological research as part of the Italian Antarctic Project; a review of the 17th Antarctic Treaty Consultative Meeting; an article in English on the effects of ultraviolet radiation on aquatic ecosystems; and a paper on the use of images obtained by remote sensing in geomorphological studies. A schedule of future meetings concludes this issue.

A-48012

Drewry, D.J., **Future of antarctic scientific research**, *Polar record*, Jan. 1993 29(168), p.37-44, 21 refs.

Future antarctic science will develop against a backdrop of heightening external pressures: the competing demands from the Antarctic Treaty System, including environmental concerns and possible operating restrictions, and the requirement to provide expert opinion from specialized research; increasing problems of the coordination of an expanding and diverse scientific community; the high cost and level of sophistication of modern research; and accountability, particularly in respect of quality scientific results. Within each of these areas national programs will assess and determine priorities for the future, which will severely test existing systems for collaboration, logistics sharing, and financial underpinning. Attention will need to be directed at a critical evaluation for the international mechanisms and frameworks for establishing the details of the antarctic scientific agenda, and its meshing with discipline-based research in general. (Auth. mod.)

A-48013

Scientific Committee on Antarctic Research, **SCAR bulletin No.108, January 1993**, *Polar record*, Jan. 1993 29(168), p.79-91.

The 22nd meeting of SCAR, held in San Carlos de Bariloche, Argentina on June 15-19, 1992, is reviewed. Highlights include summary reports of Working Group meetings held just prior to SCAR-22, their recommendations made to SCAR concerning activities in various disciplines, and the Delegates' decisions in their regard; a review of the discussion on various aspects of SCAR strategy, with emphasis on planning and management of antarctic science on an international scale; the Antarctic Science Conference, held in Bremen, Germany on Sep. 23- 27, 1991; and a summary of SCAR external and internal functions. Two additional reports of meetings held on June 8-12, 1992, also in Bariloche, are presented: that of the Council of Managers of National Antarctic Programmes (COMNAP), and the Standing Committee on Antarctic Logistics and Operations (SCALOP) meeting.

A-48017

New Zealand Antarctic Society, **Antarctic, Vol.12, No.10**, Christchurch, 1992, p.330-368.

Research activities and news items concerning New Zealand, Australia, Germany, Japan, South Africa and the United States are summarized as follows: a debate on antarctic ice sheets and global warming; an article on the resettlement of Australia's huskies in Minnesota; an outline of the current German antarctic program, including details on eight voyages of the FS *Polarstern*; an account of the activities in various disciplines of the 55 members of JARE-34; a description of the rescue of an injured South African, carried out by 4 ski-equipped Hercules aircraft; and an outline of the USAP Peninsula program for 1992-93, including details on the LTER project which will involve 3 voyages of the *Polar Duke* or the *Nathaniel B. Palmer* as well as work in the Palmer Station area. Highlights of a tour to the South Sandwich Is., and an expedition to the South Pole by two Englishmen, four American women and a Norwegian, conclude this issue.

A-48020

ANARE Club, **Aurora, Dec. 1992, Vol.12, No.2**, Melbourne, 1992, 28p.

This issue opens with a list of 23 features of the 1992/93 ANARE Science Program, and continues with a corporate statement on the Antarctic Program, describing its objectives, goals to 1997, and guiding principles. This is followed by the Antarctic Division news releases and correspondence; an article called the "Collectors' corner" with information on, and illustrations of, stamps of the French Antarc-

tic Territory (1956-1992); an article describing a journey to Spit Bay, Heard I., in 1949; and miscellaneous news.

A-48021

British Antarctic Survey, **Report for the period 1 Apr. 1991 to 31 Mar. 1992 (but reporting the full antarctic field season)**, Cambridge, Natural Environment Research Council, 111p., Pubs. p.88-101.

General remarks are made concerning staff changes and activities in various divisions at BAS stations; personnel awards are announced; distinguished visitors and British and international meetings attended are listed. Logistic and operational activities are reviewed, including ship and air operations. A science strategy plan is presented; 5 principal and 2 minor "Science Themes" provide a framework for 14 research programs which are reviewed in detail and consist of the following: pattern and change in the physical environment of Antarctica; geological evolution of West Antarctica; dynamics of antarctic terrestrial and freshwater ecosystems; structure and dynamics of the southern ocean ecosystem; physics of solar-terrestrial phenomena from Antarctica; humans in isolated polar communities; and antarctic geographic information and mapping. Included are 4 appendices providing BAS' financial background, and lists of 1991 publications and staff at various locations, divisions and ships.

A-48022

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.522, Sep. 1992**, 1992, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of Sep. 1992.

A-48023

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.521, Aug. 1992**, 1992, 31p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of Aug. 1992. Hemispheric circulation anomalies during that month are discussed and illustrated.

A-48024

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.520, July 1992**, 1992, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of July 1992.

A-48029

Looking beyond the end of the earth, *Economist*, Feb. 29, 1993 322(7748), p.91-92.

Presented here are brief resumés of projects in the mind or on the drawing board which would take full advantage of Antarctica's clear, cold, dry environment in an abundance of enterprises. The University of Chicago provides support for these endeavors through its Center for Astrophysical Research in Antarctica (CARA). The CARA projects include: Cosmic Background Radiation Anisotropy (COBRA); Antarctic Sub-millimeter Telescope and Remote Observatory (AST-/RO); and South Pole Infrared Experiment (SPIREX). In addition to Amundsen-Scott Station as a natural observatory, thoughts are dwelling on Dome A as a second site of interest. Its altitude presents

splendid but expensive research opportunities, not only in astronomy but also for moon station construction. Other colleagues are looking downward into the ice for neutrinos in a project known as the Antarctic Muon and Neutrino Detector Array (AMANDA), in which a string of photomultiplier tubes will be frozen into place about 1 km below the surface. The ice is an ideal medium for observing and tracking neutrinos which occasionally interact with an atom to create a muon that can be tracked.

A-48032

Paltridge, G., **Antarctica—the last frontier for climate modelling**, *Search*, Sep.1992 23(8), p.256-257, 1 ref.

The new Co-operative Research Centre for the Antarctic and Southern Ocean Environment (Antarctic CRC), located in Hobart, Australia, was designed to concentrate research in focussed programs that are complementary to those of other Australian agencies. In particular, the programs address the role of the polar region in determining climate and global change, as it has become obvious that the region holds a disproportionate number of the keys to climate. These keys will have to be turned before any definitive forecasts of global environmental change can be made. The programs, although highly related one to the other, are described separately in this article.

A-48038

Messner, R., **Antarctica: both heaven and hell**, Seattle, Mountaineers, 1991, 381p.

DLC G850.W8713M47

The first 3 ch. of this book, based on excerpts from the author's diary, consist of a narrative and numerous photographs of the author's experiences during his 1989-1990 expedition to Antarctica. The next two chapters present the text of the Antarctic Treaty, followed by an appeal to the world to protect the antarctic environment. Ch. 6 provides, in chronological order, a brief description of antarctic expeditions from the 18th century to the present, with a short review of historical events leading to the discovery of the continent. An appendix lists the minimum equipment required for an expedition to the South Pole.

A-48043

Quevedo Paiva, A., **Achievements and competition at the South Pole** [Hazañas y rivalidades en el Polo Sur], *Buenos Aires. Instituto Antártico Argentino. Publicación*, 1992 No.22, 145p., Texts in Spanish, English and French. Refs. p.62-64.

A synthesis and chronology is presented of various expeditions to the South Pole, and their participants from different nations, from the initial attempts and failures to the most recent achievements in land and air exploration of the area.

A-48045

Manzoni, M., **Antarctica today and tomorrow** [Antartide oggi e domani], *Relazioni internazionali*, June 1991 55(4), p.102-110, Texts in Italian and English. 3 refs.

Events leading to the Antarctic Treaty, its implementation and improvements over the years, its vast body of regulations, the function of consultative meetings and their socio-political climate are discussed in this essay. The Antarctic Treaty System is explained, as are various conventions held to reach international agreement on the protection of the antarctic environment. The history of exploitation of its living resources is reviewed, and possibilities of future economic development, especially the exploitation of mineral resources, are examined. It is concluded that widely different choices regarding the future of Antarctica are possible; international cooperation in the making of decisions is urged.

A-48046

Istituto Geografico Polare Silvio Zavatti, **Il Polo**, Sep. 1992, Vol.3, Fermo, Italy, 1992, 45p., In Italian.

Items pertinent to Antarctica in this issue consist of an article in French describing the ice shelf bridging process characterizing the regularization of antarctic coastal indentations; and a brief review, from a philatelic point of interest, of the Antarctic Treaty.

A-48085

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno**, Vol.10, No.2, Mar. 1991, 48p., In Spanish. For selected papers see A-48087 and B- 48086.

This issue covers highlights of the 10th and 11th Antarctic Treaty Special Consultative meetings, held in Viña del Mar in 1990, including discussions on the Antarctic Treaty System decision-making problems and the exploitation of antarctic resources; summaries of proposals presented at the meetings by various countries; and a calendar of activities for 1991; various news items concerning INACH and various Chilean research projects, distinguished visitors, and postal stamp issues; and articles dealing with marked seals sighted on the South Shetland Is., a review of a Portuguese expedition to "Terra Australis Incognita" in 1595, and a projection of antarctic international cooperation in the 21st century. A chronology of international scientific meetings, Jan. 30, 1991 through June 1, 1992, is included.

A-48087

García Monge, M., **Cooperation in Antarctica of the 21st century** [Antártica del siglo XXI: un sistema de cooperación ejemplar, tarea para las nuevas generaciones], *Boletín antártico chileno*, Mar. 1991 10(2), p.27-34, In Spanish. 8 refs.

The object of this essay is to contribute different points of view to a projection of Antarctica in the 21st century and international cooperation in the framework of the Antarctic Treaty System.

A-48121

Cheng, S.H., **Modern information technology and modern antarctic research**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.58-72, In Chinese with English summary. 35 refs.

This article deals with the international need to share information on present and future antarctic research; soft science and system science using modern information techniques are considered. It is pointed out that an important task of soft science in antarctic research is to solve the problems of coordination among the components of the system. The emphasis is on interdisciplinary coordination and the flexible combination of scientific research and management in a computerized information system which can quickly and efficiently reflect the most recent dynamics in antarctic research. How to establish such a system is discussed.

A-48159

Elzinga, A., **Antarctica: the construction of a continent by and for science**, Denationalizing science: the contexts of national scientific practice, edited by E. Crawford, T. Shinn, and S. Sörlin, Dordrecht, The Netherlands, Kluwer Academic publishers, 1993, p.73-106, Paper presented at the Sociology of the Sciences Yearbook Conference "What is International in Science," Abisko, Sweden, May/June 1991. Refs. and notes p.103-106.

DLC Q125.D336 1993

This chapter explores the evolution of antarctic science and the changing character of its "internationalism," as well as some of the issues central to the current debate. The point of departure is the role of science as the glue of the Antarctic Treaty System, which is a

unique international regime in politics. This centrality of science within a continually changing realm of global politicking also has some interesting repercussions on the very game we call science. Social and cognitive aspects of this equation (science “for” and “as” politics) are highlighted. Some of the specific aspects discussed are the increasing focus on the global environment; the challenge to the ATS; the growing internationalism of science and science programs; the ideological dimensions of international science; the IGY and the ATS; transformation of science and the science-politics trade-offs; globalization of science; and the dissolution of Antarctica as an object of research, becoming instead a place of research. (Auth. mod.)

A-48272

Macqueen, A.D., **Ice cores: a bibliography**, *Scott Polar Research Institute Library. Occasional bibliography*, 1992 No.16, 48p., 600 refs.

This bibliography lists all relevant publications on ice cores through June 1992, in the Scott Polar Research Institute Library database, University of Cambridge, England. Of a total of 600 citations, about 240 are pertinent to Antarctica. Included are annotations, a subject and geographic index, and an author index.

A-48273

Expéditions polaires françaises. Missions Paul-Emile Victor, **Information bulletin No.24, June 1990** [Bulletin d'information No.24, juin 1990], Paris, 1990, 110p., In French. For selected papers see B-48279 through B-48281, E-48275, G-48282, G-48283, I-48276 through I-48278 and L-48274.

Publication of the Bulletin resumes after a 21-year lapse. The issue contains reports of French research carried out on Adélie Coast in various disciplines: atmospheric and terrestrial physics, geology, meteorology, biology, and engineering. General information items include a list of the French scientific programs for 1990; an outline of the EPF/TAAF health services; an outline of measures dealing with waste disposal on antarctic stations, as proposed by the SCAR Group of Experts; and a review of some geographic names and explorers covering 3 periods: 1840 to 1938, 1949 to 1959, and 1959 to the present.

A-48290

Expéditions polaires françaises. Missions Paul-Emile Victor, **Information bulletin No.25, Aug. 1991** [Bulletin d'information No.25, aout 1991], Paris, 1991, 96p., In French. For selected papers see B-48295, E-48294, G-48297, H-48296, I-48292, I-48293 and K-48291.

This issue contains reports of French research carried out on Adélie Coast in various disciplines: atmospheric physics, meteorology, geology, biology (marine and human), and logistics. General information items include a list of the French scientific programs for 1991, the construction of a biology laboratory at Dumont d'Urville Station, and plans for removal of waste from the Station.

A-48308

New Zealand Antarctic Society, **Antarctic, Vol.12, No.9**, Christchurch, 1992, p.289-328.

Research activities and news items concerning New Zealand, Australia, France, Jamaica, Korea, Sweden, the United Kingdom and the United States are summarized as follows: further NZAP investigation into aspects of climate change; the departure and resettlement of Mawson's huskies; the continuation of the assessment of Concorde base; the 1st Jamaican Antarctic Expedition, setting out on Jan. 2, 1993; the launching of KARP-6, from Dec. 1992 to Feb. 1993; the international program for 1992/93, including Sweden, Norway and Finland; the deployment of BAS' over 40 field parties and 3 marine science cruises; a review of the biological, medical, geological, geo-

physical and glaciological programs to be carried out during the USAP's 36th consecutive season; a census of whales on Auckland I; a new team at Campbell I. for the 1992-1993 season; highlights of the 44th International Whaling Commission meeting; workshops reviewing antarctic protected areas; the opening of the Antarctic Visitor Centre in Christchurch; conservation plans for Mawson's Hut; and the chartering by Greenpeace of the yacht *Pelagic* for the 1992-1993 season. The first of a series of short articles to explain some of the anomalies in south polar history concludes this issue.

A-48316

Fujii, Y., **Activities of the wintering party at Syowa Station by the 32nd Japanese Antarctic Research Expedition in 1991**, *Antarctic record*, Nov. 1992 36(3), p.441-472, In Japanese with English summary.

The wintering party of JARE-32 performed its activities at two wintering sites from 1991 to 1992. It consisted of 31 members at Showa Station and 8 members at Asuka Station. Wintering activities at Asuka Station will be reported separately. The main scientific research programs at Showa Station were as follows: studies on ocean-atmosphere interaction in the sea ice area as part of the Antarctic Climate Research Program; environmental science studies; Polar Patrol Balloon experiments; and life science studies. Various airborne observations and inland glaciological traverses were carried out. (Auth.)

A-48339

Kriwoken, L.K., Williamsom, J.W., **Hobart, Tasmania: antarctic and southern ocean connections**, *Polar record*, Apr. 1993 29(169), p.93-102, 26 refs.

This paper describes the historical and contemporary association between Hobart (Tasmania, Australia) and Antarctica and the southern ocean. This association is traced from the sealing and whaling industries, through early exploration and scientific expeditions, to contemporary issues of institutional and educational development and tourism. It is argued that this polar link has placed Hobart at the center of some important antarctic and southern ocean developments.

A-48340

Swithinbank, C., **Airborne tourism in the Antarctic**, *Polar record*, Apr. 1993 29(169), p.103-110, 33 refs.

There are two classes of airborne tourism in Antarctica: overflights without landing, and flights including landing. The earliest overflight was in 1956, but there were no regular flights until 1977, when Qantas and Air New Zealand began overflights with wide-bodied aircraft. A crash on Mount Erebus in 1979 that killed 257 people drew attention to the absence of effective planning, air traffic control, and rescue services. Landings began in the South Shetlands Is. in 1982, when C-130 aircraft of Fuerza Aérea de Chile brought passengers from Punta Arenas. Since 1983, tourists have been accommodated in a Chilean government hostel. Flights to the interior began in 1984 when climbers were taken to the Sentinel Range by ski-equipped aircraft. Unmodified transport aircraft have been used since 1987, making wheeled landings on naturally occurring bare ice in the Heritage Range. Tourists were taken from this site to the South Pole in 1988 by smaller, ski-equipped aircraft. Owing to the lack of conventional airfields in Antarctica, the future of intercontinental operations may depend on the development of additional airfields on bare ice. There are many possible sites. Most are near the periphery of the continent but some are in high latitudes, one only 300 km from the South Pole. A few of these will allow direct flights of unmodified passenger aircraft from South America, South Africa, Australia, or New Zealand. (Auth. mod.)

A-48343

Scientific Committee on Antarctic Research, **SCAR bulletin No.109, April 1993**, *Polar record*, Apr. 1993 29(169), p.171-187.

This issue of the Bulletin is made up of reports to the XXII SCAR meeting at San Carlos Bariloche, Argentina in June 1992. Following the report of the SCAR Finance Committee, summaries are given of these Working Groups: Biology; Geodesy and Geographic Information; Geology; Glaciology; Physics and Chemistry of the Atmosphere (PACA); Solid Earth Geophysics; and Solar, Terrestrial and Astrophysical Research (STAR). The report closes with additions, corrections, and deletions to the lists of membership of SCAR and its subsidiary groups, as published in SCAR bulletin No. 107, Oct. 1992.

A-48359

Domack, E.W., Ishman, S.E., **Results of a multi-institutional research program in fjords along the Antarctic Peninsula: Cruise 90-7 of the R/V *Polar Duke***, *Antarctic journal of the United States*, 1991 27(5), p.105-108, 5 refs.

Cruise 90-7 of the R/V *Polar Duke* departed Punta Arenas on Nov. 27, 1990 with the objective of investigating the depositional processes, microfauna, and stratigraphy of the fjords along the western side of the Antarctic Peninsula. This was a multidisciplinary project involving senior research scientists from Hamilton College, Ohio State University, Colgate University, and Rutgers University. Both water-column measurements and bottom sediment samples were collected. High-resolution seismic-reflection data and 12 kHz bottom-reflection profiles were also collected. Areas of investigation ranged from Hughes Bay, northern Gerlache Strait, to Lallemand Fjord, Loubé Coast. Preliminary results have been discussed elsewhere: summarized here are some of the major findings to date.

A-48371

Tokyo, National Institute of Polar Research, **Overview of the National Institute of Polar Research '92** [Kokuritsu kyokuchi kenkyujo yoran '92], 1992, 32p., In Japanese.

The research activities of the National Institute of Polar Research are described. Also included are an organizational chart; the budget for 1992; lists of personnel with their job titles and academic disciplines; photographs of the headquarters in Tokyo and of the Showa, Mizuho, and Asuka stations in Antarctica; and a list of major publication title holdings in Japanese, English, Russian, German, and French. Research activities in Antarctica include upper atmosphere physics, atmosphere-hydrosphere physics, earth sciences, biology, polar construction and engineering, meteorites, climatology, glaciology, geology, geophysics, ecology, and medicine. Observations in Antarctica are summarized pictorially in a sketch diagram.

A-48398

Splettstoesser, J.F., **Antarctica: the last outpost of the honor system**, *Insights on global ethics*, June, 1993 p.7.

Antarctica is considered one of the "global commons" of planet Earth, thereby obligating humans as caretakers of the region. Antarctica is also a good example of a test of an honor system, in which humans have been placed in an environment where boundaries or political districts do not matter and the honor system reflects ethical concerns. The Antarctic Treaty provides the basis for all human activity in Antarctica, and because of its success since ratification in 1961, it may be viewed as a viable model for other parts of the world where harmony is lacking. (Auth.)

A-48403

New Zealand Antarctic Society, **Antarctic, Vol.12, No.11-12**, Christchurch, 1993, p.369-412.

Research activities and news items concerning New Zealand, Brazil, China, France, the Netherlands, United Kingdom and the United States cover the following: seismic reflection and wide-angle reflection data collection along the Hut Point Peninsula; New Zealand-France joint logistics agreement negotiations; details about a ship, 2 helicopters and 7 Hercules flights arranged to support Brazilian 1992-1993 operations; the Chinese expedition plans to supply their stations and undertake a marine science program; a review of institutions and organizations supporting the Netherlands antarctic program; BAS special features on Anglo-American cooperation, radio waves in geospace and environmental management; highlights of USAP summer operations at Amundsen-Scott and McMurdo stations, including ERBE, SPASE, MICE and AMANDA projects; and information on some of the 44 cruises, with tourists, planned for the 1992-1993 summer season.

A-48413

Takizawa, T., **Oceanographic observation of Lützow-Holm Bay, Antarctica in 1990**, *Polar news*, Mar. 1992 No.54, p.22-30, In Japanese.

An account is given of three observation excursions by snow vehicle on the sea ice of Lützow-Holm Bay, Apr. 24-May 12, Aug. 15-Sep. 4, and Oct. 15-Nov. 2, 1990, as part of the 31st Japanese Antarctic Research Expedition. Activities included installation of an unmanned UHF repeater station and an unmanned sea ice meteorological buoy. Snow depth on the ice at an observation point about 10 km northeast of Padda Island was 65, 135, and 152 cm, respectively in Apr., Aug., and Oct. Ice thickness from a core sample taken in Apr., about 20 km west of Ongul Island, was 190 cm, but in Aug., at an observation point about 50 km west of Ongul Island, the ice thickness was 302 cm. In Aug. the water temperature under the ice was about -1.8 C and the lowest air temperature recorded was -46.3 C.

A-48414

Fukuchi, M., **33rd Japanese Antarctic Research Expedition in 1991-93**, *Polar news*, Mar. 1992 No.54, p.31-37, In Japanese.

Activities of the 33rd Japanese Antarctic Research Expedition, consisting of a wintering party of 37 and a summer party of 16, scheduled for Dec. 1991-Mar. 1993, are summarized. A photograph of one of two newly introduced SM-100-type, 10.5-ton, 670-cm long, 345-cm wide, 315-cm high tracked snow vehicles is included. Tables are included listing the names, fields of interest, ages, and affiliations of the expedition members, and planned land-based and shipboard scientific observation activities. Research is to include the ionosphere, ocean physics, ocean chemistry, marine biology, earth crustal processes, sea ice biota, deep ice core drilling, atmospheric chemistry, atmospheric physics, upper atmosphere, and geomagnetism.

A-48416

Kanda, H., **Antarctic science conference, Germany, 1991**, *Polar news*, Mar. 1992 No.54, p.57-60, In Japanese.

The International Conference on Antarctic Science—Global Concerns, Bremen, Germany, Sep. 23-27, 1991, is summarized. The conference was sponsored by SCAR, the Scientific Committee on Antarctic Research. Topics included the Antarctic in the global scene; antarctic research in global change; progress and frontier in antarctic science; Antarctica: clues for planet Earth; the future of antarctic science; conflicts of interest in the use of the Antarctic; new technologies in support of antarctic science; resources and the environment in relation to antarctic science; and science and the Antarctic Treaty System.

A-48417

Torii, T., **Cruising to the Ross Sea region on board the *Frontier Spirit***, *Polar news*, Aug. 1991 No.53, p.3-11, In Japanese.

A cruise on the Japanese ice-going passenger ship, the *Frontier Spirit*, Feb. 26-Mar. 21, 1991, from Bluff, New Zealand, to McMurdo Station and other sites in the Ross Sea area and back to Bluff, is described. The ship, built by Mitsubishi in 1990, has a gross tonnage of 6752 tons, an overall length of 111 m, a width of 17 m, 82 cabins which can hold a maximum of 184 passengers, a crew of 88, a speed of 16.7 knots, and a draft of 4.55 m.

A-48419

Kokubun, S., **Summer activity of JARE-32**, *Polar news*, Aug. 1991 No.53, p.38-42, In Japanese.

The summer activities, Dec. 1990-Feb.1991, of the 32nd Japanese Antarctic Research Expedition, are summarized. The 32,000-cubic-meter, 471-kg PPB-2 Polar Patrol Balloon, to study stratospheric winds, the Earth's magnetic field, and aurora X-ray and electric fields, was launched Jan. 3, reached an altitude of 29.5 km, and landed Feb. 4. A sketch map shows the flight path of the previous balloon, PPB-1, Dec. 25, 1990 to Feb. 1, 1991. Summer ice conditions for navigation in Lützow-Holm Bay, with several kilometers of 5-meter-thick hummocky ice, have become more difficult from 1989 to 1991. It took a record number of about 3000 ramming maneuvers for the icebreaker *Shirase* to break through the ice in Jan. and Feb. 1991, about 2300 in 1990, and about 950 in 1989.

A-48420

Naito, Y., **Report on the 31st JARE wintering party at Syowa Station**, *Polar news*, Aug. 1991 No.53, p.43-46, In Japanese.

The activities of the wintering party at Showa Station, Feb. 1990-Jan. 1991, of the 31st Japanese Antarctic Research Expedition are summarized. The wintering party consisted of 30 members. A sketch map shows excursions from Showa Station, for oceanographic and sea ice observations in Lützow-Holm Bay, to an emperor penguin rookery off the Riiser Larsen Peninsula, and overland to Mizuho Station for maintenance of unmanned satellite observation data links. Total ozone measured at Showa Station in Sep. and Oct. was down from a normal of 300 Dobson units to 170-180 Dobson units.

A-48425

Beltramino, J.C.M., **Structure and dynamics of antarctic population**, New York, Vantage Press, 1993, 105p., Refs. p.95-101.

The basic demographics of Antarctica, its historic and political context, its seasonal shifts and endogenous population movements, its present-day structure and distribution of peoples, and its prospects for future populization are analyzed. Tables and graphs have been included in the text for a better understanding of the analysis, as well as several tables with more detailed data and information in the appendices.

A-48428

India. Department of Ocean Development, **Workshop on Antarctic Studies, May 3-5, 1988, National Physical Laboratory: seven years of antarctic research**, New Delhi, Department of Ocean Development, [1988], 54p.

DLC G845.5.W67

Scientific research projects in different disciplines, carried out during 7 Indian antarctic expeditions between 1981 and 1987, with 141 participating scientists and 342 logistic personnel, are reviewed. A summary of the Interim Report of the 7th Indian Expedition to Antarctica is included. Participating organizations in the Indian antarctic program are listed.

A-48445

New Zealand Antarctic Society, **Antarctic, Vol.13, No.1**, Christchurch, 1993, p.1-40.

Research activities and news items concerning New Zealand, Australia, Chile, Italy, the United Kingdom and the United States cover the following: the completion of a major international study of the geology of Marie Byrd Land; the drilling at Law Dome of one of the deepest holes (1,200 m) in Antarctica; an ANARE feature on Beaver Lake fossils revealing ancient forests; 11 bases opened for Chile's 1992-1993 programs; the limiting of Italy's summer plans for lack of funds; a multinational Antarctic Treaty inspection team on the Antarctic Peninsula; and the objectives of Environment 2 and Environment 3 design competitions, jointly sponsored by the American Institute of Architecture Students and the National Science Foundation's Office of Polar Programs. General news concerns conservation measures of antarctic marine living resources and Greenpeace activities during the 1992-1993 season. A review of the 7-men and women expedition to the South Pole in Jan., the Mount Vaughan Antarctic Expedition plans for the 1992-1993 summer season, and ice-biking on the Polar Plateau conclude this issue.

A-48506

Peel, D.A., **Cold answers to hot issues**, *Nature*, June 3, 1993 363(6428), p.403-404.

The item reports some of the highlights of a NATO workshop held in March 1993 in Annecy, France, addressing the recovery of atmospheric data held in Greenland and antarctic ice cores and comparing the results from both areas. Emphasis is placed on the need for a greater research effort to learn more about the sulphur family of anthropogenic chemicals in both polar regions.

A-48507

Todd, F.S., **Antarctica: an international treasure**, *Ocean realm*, Fall 1991 p.60-71.

This pictorial essay provides an overview of many facets of the antarctic diamond. Physical aspects such as size, ice, wind, cold, and dryness are noted. The marine biology, which is low in species diversity but large in numbers, is described, emphasizing the lack of major predators and the availability of krill as the diet mainstay of all other marine life. Man's history and influence in Antarctica are briefly outlined up through the IGY and the Antarctic Treaty and its effects. The piece closes with an exhortation for the care and preservation of the entire antarctic region.

A-48563

Armas Barea, C.A., ed, Beltramino, J.C.M., ed, **Antarctica at the beginning of the 1990 decade** [Antártida al iniciarse la década de 1990], Buenos Aires, Ediciones Manantial, 1992, 314p., In Spanish. Refs. passim. For individual papers see A- 48574, A-48579 through A-48583, A-48585, A-48586, A-48588, A-48591, A-48592, B-48577, B-48578, C-48593, C-48594, F-48589, G-48575, M- 48564 through M-48573, M-48576, M-48584, M-48587, M-48590 and M- 48595.

The 32 articles appearing in this first publication of the Committee on Antarctic Studies of the Argentine Council for International Relations (CARI), reflect the Committee's objective: to discuss and study antarctic issues related to the legal aspects, the Argentine national interests in Antarctica, and the international cooperation in the region. The articles are grouped according to their points of interest, including the Antarctic Treaty System, scientific activities and logistics, exploitation of living resources as well as the non-renewable resources, conservation and environmental protection, economic development, strategic and military aspects, geography and human population, and prospects for the future.

A-48574

Rinaldi, C.A., **Scientific activity in Antarctica** [Actividad científica en la Antártida], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.105-112, In Spanish.

A broad chronological account is given of Argentina's involvement in Antarctica, from its participation in an international expedition in 1899, to the inauguration of the Instituto Antártico Argentino, to the installation of various antarctic stations, and Argentina's participation in SCAR programs. The latter's principal strategic objectives are summarized, and some of its study areas are outlined.

A-48579

Davérède, A.L., **Functionality of the regime for the regulation of antarctic mineral resource activities**

[Funcionamiento del régimen para la reglamentación de las actividades sobre los recursos minerales antárticos], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.151-161, In Spanish.

Particulars of the adoption of the Convention on the Regulation of Antarctic Mineral Resource Activities are given, followed by a review of the regime's beginning operations, its implementation and international participation. Outlines of the Convention's objectives and principles, requirements for the regime's functionality, areas of applicability, and institutions are included. Also considered are the Convention's political and legal aspects, and the subsequent adoption of the Madrid Protocol.

A-48580

Barboza, J., **International responsibility in CRAMRA** [La responsabilidad internacional en la Convención para la Reglamentación de las Actividades sobre Recursos Minerales Antárticos], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.163-171, In Spanish. 12 refs.

Responsibilities of participating countries in the Convention on the Regulation of Antarctic Mineral Resource Activities are examined in the light of lawful and unlawful activities and general obligations of the states as specified in Articles 7 and 8 of the Antarctic Convention.

A-48581

Rebagliati, O.R., **Antarctic mineral resources and the 1988 Wellington Convention** [Las negociaciones sobre los minerales antárticos y la Convención de Wellington de 1988], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.173-184, In Spanish.

The history of international activities which brought about the Wellington Convention on antarctic mineral resources is reviewed. Various meetings of the Consultative Parties in which negotiations for the Convention were conducted are discussed. The objectives of the Convention are summarized; their feasibility within the framework of the Antarctic Treaty is analyzed and found promising.

A-48582

Rinaldi, C.A., **Antarctic non-renewable resources** [Recursos no renovables en la Antártida], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.185-192, In Spanish.

A brief background to the Antarctic Treaty, the mineral resource Convention of 1988, and the Madrid Protocol of 1991 is provided. A synthesis of antarctic mineral geology, based on geological research carried out by different countries in both East and West Antarctica, is presented. The general opinion of the experts indicates that the exploitation of antarctic mineral resources will not be commercially attractive for many years to come, unless the economic conditions of the international political system change drastically.

A-48583

Estrany y Gendre, A., Raballo, M.M.D., **Onshore and offshore mining operations and economic prospects**

[Actividades mineras. Operaciones en tierra firme y en el mar, sus problemas y perspectivas económicas], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.193-199, In Spanish.

Exploration and exploitation of antarctic mineral resources are briefly considered in the light of the Antarctic Treaty provisions. Results of geological research, particularly for hydrocarbons, carried out by various countries over the years—and problems encountered in the process—are reviewed. It is concluded that offshore mining is very likely to be developed sooner than that on land. Some guidelines for Argentina's mining possibilities in Antarctica are offered.

A-48585

Williams, S.M., **Conservation of living resources and the protection of ozone** [Conservación de recursos vivos y protección del medio. Evolución previsible y

perfeccionamiento del sistema con especial énfasis en la protección del ozono], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.209-215, In Spanish. 14 refs.

Recommendations from various international conventions concerning antarctic environmental protection and conservation of marine living resources, as well as prevention of further ozone depletion, are briefly examined.

A-48586

Raballo, M.M.D., **Ecosystem and environmental protection in the 1988 Wellington Convention** [La protección del medio ambiente y de los ecosistemas en la Convención de

Wellington de 1988], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.217-221, In Spanish.

A synthesis of the position of the Antarctic Treaty countries concerning the conservation of the antarctic environment is presented. Dispositions regarding the exploration and exploitation of mineral resources adopted during the 1988 Wellington Convention are reviewed. It is concluded that CRAMRA provides the maximum protection attainable in the light of conflicting national interests.

A-48588

Nascimbene de Dumont, N., **Tourism within the Antarctic Treaty System** [El turismo dentro del Sistema del Tratado Antártico], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.235-239, In Spanish.

A definition of the term "tourism" is presented to better understand the regulation of tourist activities in the framework of the Antarctic Treaty System. The history of antarctic tourist activities, and an analysis of the adopted dispositions regulating them, are reviewed.

A-48591

Beltramino, J.C.M., **Antarctic population** [Población antártica], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.263-265, In Spanish. 5 refs.

A brief demographic analysis of the human population in Antarctica shows that it consists mostly of men from both hemispheres engaged in scientific or logistic activities, generally remaining in Antarctica over a period of one year. The presence of tourists and visitors is noted in summer; no natural population growth exists; and mortality is directly related to the harsh climate and activities in the area.

A-48592

De Jorge, C.A., **Aspects of antarctic human geography** [Aspectos de la geografía humana antártica], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.267-278, In Spanish. 10 refs.

Human adaptation to, and coping with, the harsh climatic conditions and geography of Antarctica are examined from five points of interest: health, installations, transportation and communication, and energy and food supply.

A-48619

Makita, K., **Activities of the fifth wintering party at Asuka Station by the 32nd Japanese Antarctic Research Expedition in 1991**, *Antarctic record*, Mar. 1993 37(1), p.32-60, In Japanese. 2 refs.

The wintering party of JARE-32, operating at Asuka Station from Dec. 27, 1990 to Dec. 18, 1991, carried out studies in auroral physics, medicine and biology, and tested the effectiveness of a wind generator constructed at the Station. The generator produced electricity throughout the year without any problems. Meteorological charts, logistics data, and schematic illustrations of the equipment used are presented.

A-48659

Non-Acoustic Krill Data Analysis Workshop, BIOMASS report series, [June 1991] No.66, 16p. + appends. (21 leaves), 5 refs.

The workshop convened at the BIOMASS Data Centre from May 29 through June 5, 1991 to analyze *Euphausia superba* biomass and distribution data collected during FIBEX and SIBEX in Bransfield Strait. The discussions focussed on database organization, data availability and validation, analyses of krill length frequency, maturity stage distribution, relation to water mass, day-night differences, and the inter-relationships among these factors. Comments are made on the present and future status of the data center.

A-48660

Champ, M.A., **Roles of monitoring and research in polar environments: a perspective**, *Marine pollution bulletin*, 1992 25(9-12), p.220-226, 34 refs.

Environmental monitoring coupled with research provides a mutually beneficial synergism which allows scientists to efficiently monitor the environment using sensitive, relevant environmental signals to detect and quantify change; determine when change is ecologically significant; and determine the cause of change. From the perspective of potentially large-scale ecosystem impacts where causality is an objective, it is believed that environmental monitoring (i.e., research-focused monitoring) is essential and serious decoupling of monitoring and research in this context is a weak strategy and a questionable environmental policy. The perspective of this paper is that it is necessary to be very realistic in informing policy and decision makers about the ability to monitor the impact of human activities in polar regions and setting environmental guidelines. (Auth.)

A-48668

Enzenbacher, D.J., **Antarctic tourism and environmental concerns**, *Marine pollution bulletin*, 1992 25(9-12), p.258-265, 19 refs.

Increasing numbers of tourists are visiting the Antarctic. Totals from the three seasons 1989-90, 1990-91, 1991-92 were 2581, 4842, and 6495 respectively. Some environmental issues arising from antarctic tourist activity include: wildlife tolerance, waste disposal, passenger education, tour operator management practices, personnel experience, frequency of visits and ship design. Current guidelines provide a practical approach to tourism, but do not address all issues arising from tourist activity. Antarctic Treaty Parties agreed to examine the question of a comprehensive regulation of tourist activities in the Antarctic Treaty Area, and policies are under review. Some issues may prove difficult to resolve. Compliance with existing guidelines is to be encouraged, at least until more is known about the environmental effects of tourism. A management plan for tourism is needed along with more research on how tourism is conducted and the effects visits have on Antarctica's marine and terrestrial ecosystems. Cooperation between Treaty Parties and tour operators is important for the development of appropriate tourism regulations. (Auth.)

A-48730

Schroeter, B., Green, T.G.A., Seppelt, R.D., **History of Granite House and the western geological party of Scott's Terra Nova expedition**, *Polar record*, July 1993 29(170), p.219-224, 8 refs.

In summer 1911-1912 during Scott's *Terra Nova* expedition, a field party of four men led by the geologist Griffith Taylor surveyed the coast and hinterland of Victoria Land. During their stay at Cape Geology, Granite Harbour, the members of the 'western geological party' built Granite House, a rock shelter used as a kitchen. The field party finished its work in the Granite Harbour region in the second week of Jan. 1912, but heavy sea ice prevented *Terra Nova* from reaching the prearranged meeting point at the entrance to the bay. Faced with the possibility of being trapped for the winter, the party left Granite Harbour and travelled overland back toward the winter quarters on Ross I. One month later the party was picked up by *Terra Nova* and was returned safely to Cape Evans. During an expedition to Granite Harbour in Jan.- Feb. 1992, the authors discovered an 80-year-old note left by the field party in a cigarette tin near Granite House. Dated Jan. 14, 1912, the note was written by Taylor to Lt. H.L.L. Pennell, the skipper of *Terra Nova*, to let him know that the party had left for Cape Roberts. Granite House is a significant relic of the 'heroic era' and merits protection. (Auth.)

A-48731

Lyons, D., **Organisation and funding of the Australian antarctic program**, *Polar record*, July 1993 29(170), p.225-228, 8 refs.

The Australian National Antarctic Research Expeditions (ANARE) are conducted through the cooperation of various government agencies and research and interest groups. Changes in organizational arrangements since 1946 have reflected the emphasis given to different aspects of Australian antarctic policy. The antarctic program is focussed in Hobart, and the lead agency, the Australian Antarctic Division, is currently part of the federal environment portfolio. Australia spent an estimated \$A75.7 million on its antarctic program in the financial year 1991/92, \$A67.3 million, or 89%, of which was channelled through the Antarctic Division. The disposable budget for research activities has remained relatively static in real terms during the past decade. The consolidation of expenditure through the Antarctic Division and the program approach to budgeting now provide some degree of breakdown of the total expenditure, identify the large sums spent on infrastructure and technology support, and quantify the high threshold cost of research in Antarctica. It remains to be seen what effect the changes in national policies, such as the decision to ban mining in Antarctica, and geopolitical developments, will have on future levels of funding. (Auth.)

A-48734

Enzenbacher, D.J., **Antarctic tourism: 1991/92 season activity**, *Polar record*, July 1993 29(170), p.240-242, 8 refs.

A record number of tourists visited the Antarctic during the 1991/92 summer season. Data obtained by the author during antarctic field work and verified by information reported to the Division of Polar Programs, US National Science Foundation (NSF) revealed that approximately 6,500 tourists entered the Antarctic Treaty Area (south of 60S), 6,183 aboard ships, 135 on yachts, and 178 aboard aircraft. This represented a 34% increase over the previous record high of more than 4,800 tourists in the Antarctic during the 1990/91 season. During both seasons, more than 97% of these tourists travelled aboard cruise ships and yachts. Ten cruise ships, listed in a table, offered 49 antarctic cruises during the 1991/92 season; more than 43% of shipborne tourists travelled aboard ships with a capacity of 250 or more. Tabulated data show that annual tourist visits have increased substantially since the first tourists arrived in the late 1950s.

A-48736

Swithinbank, C., **Non-government aircraft in the Antarctic 1992/93**, *Polar record*, July 1993 29(170), p.244-245.

Adventure Network International (ANI), a Canadian company with a sales office in Darien, CT, used one DC-6B, two DHC-6 Twin Otters, and a Cessna 185 in support of private sector activities in Antarctica. This was the eighth consecutive season for ANI's air operations wing, Antarctic Air. The ANI camp at Patriot Hills blue ice-field in the Heritage Range of the Elephant Mountains was reopened on Oct. 15, 1992. The Cessna was excavated from winter storage at the start of the season and stowed in the hangar at the end of the season.

A-48792

Lavery, K., Reed, M.R., **U.S. Navy support activities, 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.320-323.

During the 1990-1991 austral summer, personnel of the U.S. Naval Support Force Antarctica (NSFA) provided communications facilities, weather information services, flight planning and scheduling, air traffic control services, port services, medical and dental care, galley services, material support, base operation support, and fire-fighting capabilities to the U.S. Antarctic Program. Additionally, aircraft support was provided by the U.S. Navy's Antarctic Development Squadron 6 (VXE-6), units of the U.S. Air Force, and the 109th

Tactical Air Group of the Air National Guard of Schenectady, NY. Support to the program was also provided by U.S. Army personnel under the command of the Commander of NSFA; the U.S. Coast Guard provided icebreaker support.

A-48793

Antarctic support operations, 1990-1991, *Antarctic journal of the United States*, 1991 26(5), p.323-324.

On Apr. 1, 1990 Antarctic Support Associates (ASA) officially assumed responsibility for contractor support services to the National Science Foundation's U.S. Antarctic Program (USAP). During 1990-1991, more 730 contractor employees provided support to USAP at the three U.S. stations and several remote camps in continental Antarctica and the Antarctic Peninsula. Project management, with headquarters in Englewood, CO, oversees the provision of personnel, materials, and specialized logistics. Offices in Port Hueneme, CA, and Christchurch, New Zealand, support continental antarctic activities, while support of Antarctic Peninsula and ship operations are provided through maritime agents in South America. ASA's principal tasks include: support of USAP-sponsored scientific research projects and visitor events; the operation and maintenance of facilities at McMurdo Station, Williams Field, Amundsen-Scott Station, Palmer Station, and field camps; engineering and construction of new facilities and the renovation of existing infrastructure systems throughout the Antarctic; and operation of the research vessel R/V *Polar Duke* and other ice-strengthened ships that are subcontracted by ASA for the National Science Foundation.

A-48802

Lucas, M.I., Lutjeharms, J.R.E., Field, J.G., McQuaid, C.D., **New South African research programme in the southern ocean**, *South African journal of science*, Feb. 1993 89(2), p.61-67, 59 refs.

South Africa, as an original signatory to the Antarctic Treaty in 1960, has had an active research program on the antarctic continent and in the surrounding southern ocean for the past 30 years. Recently a new program has been developed which will guide South Africa's research effort in this region for the next five years. Reported here is the oceanic component of this program that is specifically designed to address global climate change and its interaction with the antarctic marine ecosystem. The new program not only fulfils national goals but makes a contribution to the Scientific Committee for Antarctic Research (SCAR) and other international programs concerned with climate change. (Auth.)

A-48804

Drewry, D.J., **Antarctic science: a British perspective**, *Interdisciplinary science reviews*, Mar. 1993 18(1), p.15-34, 66 refs.

Intensive research by over 20 nations during the past 30 years has demonstrated increasingly the integral and often critical role of Antarctica in the natural systems of planet Earth. The Antarctic is fundamental in driving the global atmospheric regime owing to its strong negative radiation budget, and the southern ocean, linking the Atlantic, Indian and Pacific oceans, plays an influential but not well understood role as a major sink for carbon dioxide. Man-induced increases in greenhouse gases are likely to have profound effects on the lower atmosphere of the South Polar regions where general circulation modeling predicts a strong temperature change response. The reaction of the ice sheet to warming is complex and includes ice shelf-sheet destruction as well as increased snow accumulation, both of which affect world sea level. Antarctica also forms an ideal observatory for studying the processes whereby solar radiation and particle outflow directly influence the Earth's environment through energy transfer to the upper atmosphere. The presence of chlorofluorocarbons in the stratosphere has resulted in the depletion of ozone in the austral spring, a discovery by the British Antarctic Survey (BAS) that above

all others has given a place to Antarctica on the world environmental stage. This review provides a progressive trail of the depth, scope, and evolution of antarctic science programs and some of the political forces involved, using the development of BAS as the catalyst through which the advance is recorded. (Auth mod.)

A-48811

Beike, D., **Engineering-economic evaluation of offshore oil and gas development in the Ross Sea, Antarctica**, Research reports of the Link Energy Fellows, Vol.7. Edited by B.J. Thompson, Rochester, University of Rochester Press, 1992, p.3-61, 132 refs.

DLC TJ163.25.U6 R47

This paper speculates about the viability of antarctic petroleum development and estimates when antarctic oil production will become economically feasible. This analysis is based on a hypothetical exploration and development model which could require a US \$7.6 billion investment in 1991 constant dollars. Following a 20 year development period, a 30 year project life producing an initial 144,000,000 bbl per year, with a 5% decline rate is assumed. Exploration is based on a floating conical drilling unit. Production is based on a concrete Tension Leg Platform concept, with subsea completion. Storage will be in a seafloor facility and transportation will be by icebreaking tankers. The Ross Sea was chosen as the most promising petroleum-producing area in the Antarctic, because it has the most promising sedimentary basins, has had the most scientific exposure, and is environmentally the most favorable area.

A-48818

Great Britain. Antarctic Place-names Committee, **Gazetteer of the British Antarctic Territory; second edition**, London, Her Majesty's Stationery Office, 1993, 45p.

A list is presented of 4,498 geographic names approved by the Antarctic Place-names Committee up to the end of Dec. 1992. The list includes 73 new names gazetted for the first time, 6 altered forms of names previously listed as accepted, and 2 previously rejected names that have now been accepted. The latitudes and longitudes presented were taken from the latest sources available. The coordinates of 34 names have been amended as a result of recent surveys.

A-48851

Fogg, G.E., **History of antarctic science**, Cambridge, University Press, 1992, 483p., Refs. p.415-463.

DLC G860.F64 1992

Politics has always played a major role in the development of antarctic science from the times of Halley, Cook, Bellingshausen, Scoresby, Waddell, Eights, and many others, up through the Madrid Protocol in 1991. Most of the funding was provided by governments which had their own agendas beyond science to promote; most of the expeditions travelled on naval vessels, and much of the scientific data was gathered by naval personnel. This account delves into the expedition and discovery period, about 1/3 of the book, bringing the tale up through the first quarter of the 20th century. The modern period carries it up to the present time, showing the advent of more sophisticated technology and logistics and emphasizes the enlargement of the political processes encompassing most of the modern world. About half the book recounts the development of the numerous disciplines, including earth sciences, oceanography, atmosphere and geospace, land based biology, and medicine. Changes in philosophy, particularly the outlook on the environment and man's effect on it because of and through scientific activities are set forth.

A-48884

Cooper, J., Headland, R.K., **History of South African involvement in Antarctica and at the Prince Edward Islands**, *South African journal of antarctic research*, 1991 21(2), p.77-91, Refs. p.87-91.

South Africa's involvement with Antarctica and the subantarctic Prince Edward Is. is reviewed from the early days of exploration to the current day. Emphasis is placed on little-known but interesting events as well as the major activities and achievements of these years. (Auth.)

A-48888

Swierstra, M.J., **South African National Committee for SCAR**, *South African journal of antarctic research*, 1991 21(2), p.114-116, 3 refs.

The National Committee at present consists of the South African correspondents of the SCAR working groups. Chairmen of the Scientific Committees of the Department of Environment Affairs, representatives from the Departments of Environment Affairs, Foreign Affairs, and Mineral and Energy Affairs, and representatives of the societies mentioned above. A list of chairmen from 1964 to 1991 is given in a table. The National Committee is responsible for maintaining contact with SCAR, for electing the national delegate and alternate delegate to SCAR, for making funds available for the attendance of the national delegate to the biennial meetings of SCAR, and for payment of the annual membership dues. The annual report to SCAR is prepared by the Department of Environment Affairs, but is submitted to SCAR under the aegis of the National Committee.

A-48891

Gon, O., **Concise review of antarctic fish research in South Africa**, *South African journal of antarctic research*, 1991 21(2), p.124, 14 refs.

The author now believes that the geographical position of South Africa in relation to Antarctica is rather disadvantageous for South African antarctic biological research, including ichthyology. On the one hand, the proximity of Argentina and Chile to the Antarctic Peninsula allows for frequent visits at the relatively low cost of overnight crossing of the Drake Passage. On the other hand, for the Northern Hemisphere nations the only economic way to operate research vessels in the southern ocean is in long-term cruises, making use of refuelling and restocking facilities in southern South America. In the case of South Africa, the 10-day trip from Cape Town to SANAE Station is long and costly, especially in the current state of the South African economy. In addition, South African fish research in the southern ocean is still suffering from the lack of a research ship that can be used for trawling. However, this will soon be rectified, as the *SA Agulhas* is due for a major refit during which new trawling facilities are to be installed.

A-48910

Siegfried, W.R., **Three decades of South African science in Antarctica**, *South African journal of antarctic research*, 1991 21(2), p.225-229, 9 refs.

This report highlights the scientific achievements and administrative aspects of South Africa's involvement with the Antarctic and the Subantarctic since 1960. The programs discussed cover the fields of meteorology, oceanography, biology, earth sciences and space physics.

A-48923

Shears, J.R., Hall, J., **Abandoned stations and field huts—The British approach to management**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.12-26, 7 refs.

The recently adopted Protocol on Environmental Protection to the Antarctic Treaty (1991) requires abandoned research stations and work sites left in Antarctica to be cleaned up. However, this obligation does not require the removal of any structure designated as an

Historic Monument (HM) under Recommendation I-IX of the Antarctic Treaty, or if the removal of any waste material is likely to cause a greater adverse impact than leaving that material untouched. The approach adopted within BAS to the management of the abandoned British stations has been to develop a three phase program of initial desk study and survey, action plan, and future building management. From the results of the field survey a comprehensive action plan is being developed. Options for each base are clean-up and removal, repair and maintenance as an emergency refuge, or restoration and conservation as an Historic Monument. At present, no former BAS or FIDS station has been declared an HM. (Auth. mod.)

A-48945

Blasi, L., de Simone, M., **Short wave automatic system for data transmission between Rome and the Italian Antarctic Base**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.318-345.

Short-wave communication allows independent point to point connections which have a very low running cost, due mainly to the amortization of the cost of the apparatus and the cost of licenses. However, this type of radio communication is heavily influenced by the conditions of ionospheric propagation. This negative influence can be reduced by using techniques of data transmission employing adaptive modems which can automatically and autonomously manage the radio connection. The ENEA Antarctic Project, having the responsibility of telecommunications within the framework of the Italian National Program of Antarctic Research (PNRA), has been experimenting with these techniques and systems together with industry. This paper discusses the work done up to now and its organization.

A-48946

Balteas, N., Kohnen, H., **MICROSAT based communication system for rescue services and world-wide data transfer from the Antarctic**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.346-358.

POLARCOM is a MICROSAT based low-cost communication system for special use in the Arctic and Antarctic. It provides full voice and digital data transfer capability. The communication principle is based on DTDMA-Slotted Aloha which is an optimum between channel capacity and experimental as well as expedition needs. This paper describes the overall system architecture and points out the benefit of the system for the antarctic scientific community. An experimental satellite launched in 1991 successfully proved the feasibility of such communication links. (Auth. mod.)

A-48947

Hughes, G.L.M., **Communications and the antarctic network**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.359-365.

After covering the introductory organizational structure, the article describes the British Antarctic Survey (BAS) computing model and computing facilities, including station facilities and the antarctic network, communications, the message handling system and sending files. Future developments, computing policy development and communications developments are discussed. It is pointed out that BAS has established computing facilities at the antarctic stations which mirror those available in BAS HQ. All stations and HQ can

link to form a wide area antarctic network. Communications traffic has been transferred to this network, resulting in significant cost savings.

A-48972

Van Bennekom, S., **Bonn, the 16th Antarctic Treaty Consultative Meeting**, *Circumpolar journal*, 1991 6(1-2), p.77-79.

Highlights of the Protocol to the Antarctic Treaty on Environmental Protection are outlined, and some gaps in the new measures—as discussed at the 16th Antarctic Treaty Consultative Meeting in Bonn following the signing of the Protocol—are summarized.

A-49007

Cisak, J., **List of place-names in Antarctica introduced by Poland in 1978-1990**, *Polish polar research*, 1992 13(3-4), p.273-301, 10 refs.

A-49157

Wolff, W.J., **Dutch expedition to Arctowski, King George Island**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.5-9, 1 ref.

Logistics of the Dutch antarctic summer expedition of 1990-1991 are summarized. Using the Polish vessel ORP Arctowski and the Arctowski Station facilities, the Dutch program concentrated on sea research.

A-49171

Stonehouse, B., **Scientific activities in Antarctica, opportunities for the Netherlands**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.156-161.

Pointing out that the Dutch scientists who are working in Antarctica seem to be at a turning point, and considering that the way in which the scientific program of the Netherlands might continue is under review, the author makes some suggestions on how they can develop their activities within the framework provided by SCAR and the Antarctic Treaty System.

A-49172

Duursma, E.K., **Netherlands Antarctic Programme (NAAP) 1994-2000**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.162-167, 4 refs.

The history of Dutch participation in SCAR, COMNAP, the admittance as a Consultative Party, and research carried out within the Netherlands Antarctic Program since 1985 are summarized. Logistic policies set out by the Committee on Antarctic Research, along with five major research fields selected, are outlined.

A-49173

Bull, C., ed, Wright, P.F., ed, **Silas: the antarctic diaries and memoir of Charles S. Wright**, Columbus, Ohio State University Press, 1993, 418p., Refs. p.397-418.

DLC G850 1910.W75 1993

This collection of journals, memoirs, and letters tells the remarkable story of Robert Falcon Scott's last journey to the Antarctic, as seen through the eyes of Charles S. Wright, the expedition's physicist and glaciologist. When Captain Scott left Britain in 1910 on his second and last antarctic expedition, he took with him the most comprehensive party of scientists yet to visit the continent. Among them was Charles Wright, a young Canadian. Wright's diaries, illustrated in detail by his daughter Pat F. Wright, have been edited by Pat Wright

and by polar explorer and glaciologist Colin Bull. They provide an insider's view of a significant adventure in the advancement of polar scientific discovery.

A-49184

U.S. National Science Foundation, **Antarctic journal of the United States**, vol.28, no.2, Washington, D.C., 1993, 24p.

This issue of AJUS provides a broad spectrum of events and changes in the U.S. antarctic community both on and off the antarctic continent. Changes in leadership marked the departure of Dr. Peter Wilkniss as head of OPP when Dr. Cornelius Sullivan was appointed to replace him. Wilkniss noted the paradox at McMurdo and Sullivan described the 4th age of antarctic research which emphasizes the global aspects and impacts of natural and man-made events in Antarctica. The face of McMurdo is drawn through its research lifetime and into a future in which its frontier atmosphere may be supplanted by modern laboratories and technologies. While all of this is progressing, wood fossils and microscopic marine organisms have been discovered near McMurdo; a glacier ice based/snow packed runway, dubbed Pegasus, for wheeled aircraft, has come into being about six miles from McMurdo; long- duration aloft balloons are being readied to probe Mars and the Sun; Dante's stumble on Erebus may yet produce positive results; waste incineration is halted at McMurdo; and at the South Pole, the first automated geophysical laboratory tracks magnetic fields and aurora lights. Science and support personnel at McMurdo, Palmer, and Vostok Stations are listed; NSF grants for the period 11/28/92 to 3/1/93 are shown, as are weather summaries for McMurdo, Palmer, and Amundsen-Scott Stations for Feb., Mar., and Apr. 1993.

A-49199

New Zealand. Ministry of Foreign Affairs and Trade. NZAP, **Antarctic field manual**, Christchurch, 1993, 118p.

This manual is for guidance to field events, which are defined as parties leaving Scott Base by surface or air transport on a scheduled program for scientific, support, maintenance or recreational reasons. With the greatest emphasis on safety, the information contained in the manual is the result of many years of experience in Antarctica, covering field travel, flying, surface transport, field organization and camping, search and rescue, refuge huts, field communications, and clothing and equipment.

A-49200

New Zealand. Ministry of Foreign Affairs and Trade. NZAP, **Antarctic operations manual**, Christchurch, 1993, 88p.

This manual is provided to assist all participants of the New Zealand Antarctic Programme with information on New Zealand's activities in Antarctica, and their individual role and responsibilities. The program's administration, operations and obligations specified in the Antarctic Treaty regarding conservation and protection of antarctic environment, historic monuments, tourism and international relations are discussed.

A-49201

New Zealand. Ministry of Foreign Affairs and Trade. NZAP, **New Zealand Antarctic Programme 1993/94**, Christchurch, 1993, 39p.

The 1993-1994 New Zealand antarctic program will involve some 250 scientists, base support and field staff. In total, there will be 50 events undertaken with most of the scientific activity being conducted in and around Ross I., McMurdo Sound and the Dry Valleys. The research organizations involved in the program are listed, and more than 40 projects, covering many disciplines, are outlined.

A-49219

Stonehouse, B., **Shipborne tourism in Antarctica: Project Antarctic Conservation studies 1992/93**, *Polar record*, Oct. 1993 29(171), p.330-332, 8 refs.

The period Dec 1992 through Mar 1993 marks the third season for Project Antarctic Conservation (PAC) tourism studies in the Antarctic Peninsula region. The first two seasons are reviewed briefly. During the third season, continuing observations were made on Cuverville I. to assess how well tour group operators handled their visitors with regard to landing group size, group control on site, and how well the groups ashore followed visitor guidelines. Counts and assessments of group environmental impacts were made. The 1992/93 season's work resulted in the preparation of a draft management proposal for an Antarctic Special Management Area covering Cuverville I., Danco I., and the Errera Channel, to allow for continuing research in that much-visited area. This and two further draft proposals covering Port Lockroy and Hannah Point have been submitted to the UK Foreign and Commonwealth Office. Preparation of these draft plans disclosed some practical difficulties of interpretation in the form of presentation prescribed under the Antarctic Treaty Protocol, which are currently under discussion. (Auth. mod.)

A-49220

Scientific Committee on Antarctic Research, **SCAR bulletin No.111**, Oct. 1993, *Polar record*, Oct. 1993 29(171), Meeting of the SCAR Executive Committee, Stockholm, Sweden. 13-14, and 16 April 1993, p.345-364.

This issue of the Bulletin contains the minutes of the SCAR Executive Committee meeting in Stockholm, Sweden on Apr. 13, 14, and 16, 1993, including a review of the 17th ATCM; the report of the joint meeting of the SCAR and COMNAP Executive Committees in Stockholm on Apr. 15, 1993; and Recommendations to the respective governments adopted by the 17th ATCM at its sessions in Venice, Italy, Nov. 11-20, 1992.

A-49225

U.S. National Science Foundation, **United States Antarctic Program. Science Program Plan 1992-93**, [Washington, D.C., 1992], var.p.

This Science Program Plan contains a synopsis of each science project planned for the 1992-93 United States Antarctic Program (USAP). The USAP will support about 120 projects involving approximately 540 investigators and technicians. Of those, about 75% of the projects and personnel will transit through New Zealand and McMurdo Station (referred to as the Continental System). These can be further broken down as projects based out of McMurdo (including sea ice and Dry Valley work), Amundsen-Scott Station, and projects requiring dedicated LC-130 support to remote field camps. There are approximately 27 projects involving some 97 investigators working at Palmer Station, in the Antarctic Peninsula, on the R/V *Polar Duke*, and on the R/V *Nathaniel B. Palmer* (referred to as the Peninsula System). The plan is generally descriptive and is meant as a summary of projects that have received support to do research in the Antarctic.

A-49274

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 8, No.5, May 1993, p.31-37, In Italian.

This issue contains short news items concerning the following: a study of the physiological and behavioral adaptation of King Penguins to antarctic environmental conditions; international research projects in antarctic meteorology related to stratospheric warming and sea level changes; the physical and dynamic properties of polar sea ice; Japanese laboratory research on the construction of ice containers; population growth of Adélie Penguins in the Ross Sea region; and publications.

A-49276

Herber, B.P., **Mining or world park? A politico-economical analysis of alternative land use regimes in Antarctica**, *Natural resources journal*, Fall 1991 31(4), p.839-857, 85 refs.

DLC K14.A868

The international politics of Antarctica are discussed, beginning with the situation before the signing of the Antarctic Treaty and continuing with the description of the Treaty provisions and the role of the Antarctic Treaty System. Under the alternative land use policies in Antarctica, science, tourism, marine living resources, mining, and the world park option—under which the continent would be preserved in its present pristine state as a nature reserve—are examined. Arguments for an antarctic mining regime and arguments for an antarctic world park, as well as the possibility of a compromise, are considered.

A-49279

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 7, No.11-12, Nov.-Dec., 1992, p.71-83, In Italian.

This issue contains short news items concerning the following: a two-man traverse expedition from the Weddell Sea to the South Pole, intended to promote the creation of a new multiple-sclerosis research center in Cambridge, U.K.; the Japanese signing of the Protocol on Environmental Protection to the Antarctic Treaty; the voluntary sinking of the French support ship *Ventre III* in Kerguelen waters, to be replaced by the more modern *L'Aventure*; the First Jamaican Antarctic Expedition; the micro-algal physiological processes contributing to an increase in shelf ice formation; the permanent removal of huskies from Antarctica; the 1992-1993 Swedish antarctic program, carried out jointly with Norway and Finland; the opening of a new runway at the Dumont d'Urville Station; the USAP program for 1992-1993; the role of antifreeze proteins in antarctic fish; and publications and book reviews.

A-49280

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 8, No.1, Jan. 1993, p.1-8, In Italian.

This issue contains short news items concerning the following: an editorial on the financial and political reasons for the absence of an Italian 1993 antarctic program; the 50-day walk to the South Pole by the Norwegian Erling Kagge, covering 1390 km on foot; a hypothesis of antarctic deglaciation 3 m.y.a.; the improvement of antarctic air transport by the use of C5 Galaxy aircraft; a discussion on the relationship between the volcanic eruption of Mt. Pinatubo and ozone depletion; and publications.

A-49281

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 8, No.2, Feb. 1993, p.9-16, In Italian.

This issue contains short news items concerning the following: plankton response to increased ultraviolet radiation; the use of vertical-axis wind turbines, with integrated generator, at the Georg von Neumayer Station; installation of 34 automatic meteorological stations in Antarctica, a University of Wisconsin project; Emperor Penguins and ARGOS satellite collecting system; the postponement from Feb. to Nov. of the inauguration of the new runway at Dumont d'Urville Station; a satellite survey of algal populations (*Macrocystis pyrifera*) in the Kerguelen Archipelago; and publications.

A-49282

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 8, No.3, Mar. 1993, p.17-23, In Italian.

The only news item concerning Antarctica in this issue deals with plans for a geophysical observatory at King Sejong Station. In addition, an article is presented describing the physiology, morphology and exploitation of the ice fish *Champsocephalus gunnari* Lonberg and another, in English, discussing the remains of an ancient forest in the central Transantarctic Mountains suggesting a new view of Antarctica's past.

A-49283

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol. 8, No.4, Apr. 1993, p.24-30, In Italian.

This issue contains short news items concerning the following: the removal of the remaining oil on the sunken ship *Bahia Paraiso*; the completion of a 1200 m deep ice cover penetration at Law Dome; penguin physiology during the molt; inhibition of phytoplankton photosynthesis by UV radiation; the growing of the antarctic ice sheet; effects of sudden warming on the sea ice of West Antarctica; *Marion Dufresne* after 20 years of oceanographic research; the blue-ice runway at McMurdo Station; and publications.

A-49285

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic field manual**, 1991, Christchurch, 1991, 111p.

This manual is for guidance to field events, which are defined as parties leaving Scott Base by surface or air transport on a scheduled program for scientific, support, maintenance or recreational reasons. With the greatest emphasis on safety, the information contained in the manual is the result of many years of experience in Antarctica, covering field travel, flying, surface transport, field organization and camping, search and rescue, field communications, clothing and equipment.

A-49286

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **New Zealand Antarctic Research Programme, 1991/92**, Christchurch, 1991, 40p.

The 1991/92 NZARP will involve some 214 scientists, base support and field staff. In total, there will be 52 projects undertaken, with most of the scientific activity being conducted in and around Ross I., McMurdo Sound and the Dry Valleys. Six divisions of the Department of Scientific and Industrial Research will be involved in 11 separate events. All projects are briefly outlined and cover many disciplines, including biology, meteorology, geology, atmospheric physics and glaciology.

A-49287

New Zealand. Department of Scientific and Industrial Research. Antarctic Division, **Antarctic operations manual**, 1991, Christchurch, 1991, 91p.

This manual is provided to assist all New Zealanders working in Antarctica and all persons attached to the New Zealand Antarctic Research Program in becoming informed on New Zealand's activities in Antarctica, and their individual role and responsibilities. The program's administration, operations and obligations specified in the Antarctic Treaty regarding conservation and protection of antarctic environment are discussed.

A-49288

New Zealand. Ministry of External Relations and Trade. NZAP, **Antarctic operations manual**, Christchurch, 1992, 85p.

This manual is provided to assist all participants of the New Zealand Antarctic Program with information on New Zealand's activities in Antarctica, and their individual role and responsibilities. The program's administration, operations and obligations specified in

the Antarctic Treaty regarding conservation and protection of antarctic environment, historic monuments, tourism and international relations are discussed.

A-49306

New Zealand. Ministry of External Relations and Trade. NZAP, **Antarctic field manual**, Christchurch, 1992, 115p.

This manual is for guidance to field events, which are defined as parties leaving Scott Base by surface or air transport on a scheduled program for scientific, support, maintenance or recreational reasons. With the greatest emphasis on safety, the information contained in the manual is the result of many years of experience in Antarctica, covering field travel, flying, surface transport, field organization and camping, search and rescue, refuge huts, field communications, and clothing and equipment.

A-49326

Russian Committee on Antarctic Research, **Report to SCAR No.34, 1992, on the Russian antarctic scientific activities. I. Record of activities Apr. 1, 1991-Mar. 31, 1992. II. Planned activities Apr. 1, 1992-Mar. 31, 1993**, Moscow, 1993, 29p., In English with bibliography of the Soviet antarctic literature for 1991 in Russian, p.27-29.

Outlines are presented of projects in progress and proposed at Russian antarctic stations. Disciplines include terrestrial and atmospheric sciences, meteorology, Earth sciences, glaciology, biology, oceanography, medical sciences and logistics. Names of principal investigators and a list of responsible institutions are included.

A-49327

Académie des sciences, Paris. Comité national français des recherches antarctiques, **Report No.35 to SCAR. Scientific activities from Apr. 1, 1992 to Mar. 31, 1993 and projected activities (Apr. 1, 1993 to Mar. 31, 1994)** [Rapport No.35 au Comité scientifique pour la recherche antarctique (S.C.A.R.). Activités scientifiques du 1er avril 1992 au 31 mars 1993 et prévues (1er avril 1993 au 31 mars 1994)], Paris, 1993, 79p., In French. Bibliography p. 55-68.

The report provides the following information: the geographic and geomagnetic positions of the Dumont d'Urville Station on Antarctica and those of the other 3 French stations on the subantarctic islands; a list of permanent observatories and brief descriptions, and names of principal investigators, of programs conducted at the observatories and on the stations from Apr. 1992- Mar. 1993, in atmospheric and terrestrial physics; meteorology; biology; fisheries; oceanography; glaciology; geology; and medical sciences; and outlines of studies projected from Apr. 1993 to Mar. 1994 in the above fields. The report includes an account of French measures undertaken to meet the specifications in Annexes 1-4 of the Madrid Protocol regarding the protection and conservation of the antarctic terrestrial and marine environments. A list of names of participating scientists, and the institutions with which they are affiliated, concludes the report.

A-49328

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.524, Nov. 1992**, 1992, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of Nov. 1992.

A-49329

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.525, Dec. 1992**, 1992, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including hemispheric circulation anomalies and ozone measurements, with tables and graphs for the month of Dec. 1992.

A-49330

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.526, Jan. 1993**, 1993, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including hemispheric circulation anomalies and ozone measurements, with tables and graphs for the month of Jan. 1993.

A-49331

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.527, Feb. 1993**, 1993, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including hemispheric circulation anomalies and ozone measurements, with tables and graphs for the month of Feb. 1993

A-49332

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.528, Mar. 1993**, 1993, 30p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of Mar. 1993.

A-49333

South Africa. Weather Bureau, **Newsletter/Nuusbrief, No.531, June 1993**, 1993, 32p., Text and titles in Afrikaans or English.

South African research activities on Marion and Gough islands and at Sanae Station, along with general news items, are reported. Weather reports are presented, including ozone measurements, with tables and graphs for the month of June 1993.

A-49334

Australia. Antarctic Division, **ANARE news, No.73**, Kingston, Tasmania, 1993, 40p.

The beginning feature presented in this issue deals with "The new Antarcticans: tourism in the ice", examining the effects of tourism on the ongoing scientific research, its position in the Antarctic Treaty framework, its impact on the environment, and the response to it by the Australian government. The feature includes some reflections and impressions of antarctic tour guides and an article on the management of visitors to Macquarie I. The science news items cover briefly activities of Australian glaciological and biological teams, marine science cruises in Prydz Bay, and the stirring of the volcano on Heard I. Other information includes operations at various Australian stations, antarctic news of a general nature, review of recent publications, weather summaries for Nov.-Dec. 1992 and Jan. 1993 at Mawson, Davis, Casey and Macquarie I., and a 1993-1994 chronology of conferences and symposia.

A-49335

Australia. Antarctic Division, **ANARE news, No.74**, Kingston, Tasmania, 1993, 32p.

The beginning feature presented in this issue deals with ANARE at sea: Australia's antarctic marine science, covering the *Aurora Australis* second voyage (Voyage 9, Mar.-May 1993) concentrating on oceanography, glaciology and marine biology between Tasmania and Antarctica, and Voyage 7, Jan.-Mar., 1993 engaged mainly in marine biology and marine geology in the Prydz Bay region. The feature includes an article about the difficulties in marking and tracking two crabeater seals around the antarctic pack ice. The science news items cover brief reports on the future of antarctic scientific research, marine sediment collection in Prydz Bay, classification and description of siliceous cysts, a 1500 km glaciology traverse south of Mawson, the tracking of albatrosses, and the greenhouse role of antarctic archaean. Other information concerns Australian stations and news of a general nature, review of recent publications, weather summaries for Feb.-Apr. 1993 at Mawson, Davis, Casey and Macquarie I., and a 1993-1994 chronology of meetings.

A-49340

Kanzawa, H., **Report on Workshop "Study of the polar atmosphere and cryosphere using satellite data with surface validation observations including unmanned one"**, *Antarctic record*, July 1993 37(2), p.196-203, In Japanese with English summary.

The workshop was organized to discuss algorithms to derive parameters of the polar atmosphere and cryosphere using satellite data received mainly at Showa Station. The contents of the workshop are as follows: the present status of receipt and utilization of the satellite data of NOAA, MOS-1, ERS-1, and JERS-1; the atmosphere; sea ice; the cryosphere; and introduction to the satellite data analysis system at the Information Science Center at NIPR. (Auth. mod.)

A-49346

ANARE Club, **Aurora, June 1992, Vol.11, No.4**, Melbourne, 1992, 32p.

This is the 80th-birthday-celebration issue in honor of the scientist Phillip Law, who joined ANARE at its very beginning as Senior Scientist on the 1947-48 *Wyatt Earp* expedition. The following is reviewed: the Phillip Law Symposium, held in Melbourne on Apr. 23, 1992; the scientist's early years and ANARE activities from 1947 to 1966; highlights of Australia's antarctic research programs and future directions; and ANARE's 50th anniversary, with an outline of a 6-year strategy for the Jubilee Program beginning in 1992-1993 and ending 1997-1998. Also presented are accounts of the Prince Charles summer program 1991-1992, the *Icebird* 1991-92 resupply voyage to Davis and Mawson stations; an article on monitoring underground nuclear explosions based on data from a network of Australian seismic stations; and miscellaneous news.

A-49347

ANARE Club, **Aurora, Mar. 1993, Vol.12, No.3**, Melbourne, 1993, 24p.

This issue contains news items concerning developments in the BMR, including the changing of its name—from Bureau of Mineral Resources, Geology and Geophysics to Australian Geological Survey Organisation (AGSO)—and the outline of some of its projects in Antarctica. The articles that follow deal with the mourning for the loss of Australia's antarctic husky dog teams; some observations on the *Icebird* Voyage 3 in 1992 and an account of a journey to Heard I. in 1949; a narrative of J.S.C. Dumont d'Urville's voyages to Antarctica in 1837-38 and in 1840; the role of surveyors in Antarctica; and miscellaneous news.

A-49348

ANARE Club, **Aurora, June 1993, Vol.12, No.4**, Melbourne, 1993, 24p.

The opening article in this issue is an edited version of a research thesis on the military implications of Antarctica. The topics discussed include the Australian position in Antarctica (political policy, the environment, defense policy, etc.); Antarctica's strategic significance to Australia (research, resources, geographic location); the balance to Australian strategic concerns provided by the Antarctic Treaty; the areas of dispute (environmental protection, territorial claims, natural resources); Australia's strategic options, including military activity outside and within Antarctica; and considerations of a defense strategy for the Australian Antarctic Territory within the Treaty's framework. Other items of interest in this issue concern the death of an expeditioner at Mawson in 1963; a Mawson to Davis traverse by dog teams, also in 1963; the 1993 issue of French antarctic stamps; the use of a car at Mawson Station in 1963 and a Russian visit, from Mirnyy to Mawson, in the fall of the same year; and miscellaneous news.

A-49349

ANARE Club, **Aurora, Sep. 1993, Vol.13, No.1**, Melbourne, 1993, 28p.

This issue opens with several news releases from the Antarctic Division, in June and August 1993, and continues with details of the demolition of the old Casey Station, with several photographs of the work in process; a list of names of wintering parties at Old Casey from 1968 to 1988; an account of a summer (1975-76) at Casey Station by the first women to visit the antarctic continent with an Australian expedition; a review, 30 years later, of how Wilkes Station was replaced by Casey; an account of a wintering party at Spit Bay on Heard I. in 1992; a review of the ANARE experience with the Global Positioning System (GPS), a satellite-based radio-navigation system operated by the U.S. Department of Defense; and miscellaneous news.

A-49443

Home, R.W., Maroske, S., Lucas, A.M., Lucas, P.J., **Why explore Antarctica? Australian discussions in the 1880s**, *Australian journal of politics and history*, 1992 38(3), p.386-413, 81 refs.

In this paper, the authors focus upon the efforts of a group of scientists and interested enthusiasts in late-nineteenth century Australia to promote exploration in the far south. Even though the group did not succeed in its immediate objective of seeing an Australian (or, rather, Australasian) expedition in the field—it was to be another 20 years before such an expedition was mounted—the authors believe its activities warrant greater attention than they have so far received. They are of interest for what they reveal about late-nineteenth century perceptions of Antarctica; about the degree of Australian involvement with the region; and about the nature of the support available in Australia at the time for scientific research more generally. By placing the Australian efforts within an international context, one is better able to assess their significance in the overall history of antarctic research. (Auth. mod.)

A-49454

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari, Vol.8, No.7-8**, July-Aug. 1993, p.45-51, In Italian.

This issue contains the following new items concerning Antarctica: the lowering of a robot into the crater of Mt. Erebus, intended to collect seismic data and gas and rock samples in areas inaccessible to humans; an article on the geographic distribution and morphological, reproductive, behavioral and other characteristics of the dolphin *Orcinus orca*; a short recollection of the voyage from Italy to Antarc-

tica of the ship *San Giuseppe Due*, 1973-1974; the French government matriculation of merchant and other ships at Port aux Français (Kerguelen Is.); and a short list of recent scientific publications.

A-49455

Centro Ricerca e Documentazione Polare, Rome, **Polar news/Notizie polari**, Vol.8, No.6, June 1993, p.38-44, In Italian.

The only item concerning Antarctica in this issue is an article in English discussing a study on the transmission of ultraviolet radiation in the Weddell Sea, including a description of the chemical processes causing ozone depletion, the effects of cloud cover on UV absorption in terrestrial and marine ecosystems, and the protective mechanisms of microalgae against UV effects.

A-49458

Argentina. Dirección Nacional del Antártico, **Antártida Argentina**, Oct. 1992, No.18, Buenos Aires, 1992, 97p., In Spanish.

This issue, the 4th edition of *Antártida Argentina*, provides an overview concerning all aspects of the antarctic continent, from its geography, history, ecology, climate, political and economic issues and its significance to the rest of the planet, to antarctic activities, claims and cooperation of the international community in the framework of the Antarctic Treaty.

A-49459

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno**, Vol.12, No.2, Oct. 1993, 44p., In Spanish. Refs. passim. For selected papers see A-49460, A-49461, C-49462 and C-49463.

This bulletin reviews the following: the second part of an article on the history of the South Shetlands and the sealing industry; the 17th Antarctic Treaty Consultative Meeting; a topographic survey of the Fildes Peninsula; national activities, including plans made by the Antarctic Coordinating Council for 1993, INACH activities and its role in antarctic scientific research, logistic support and environmental protection, and outlines of various projects to be carried out in the 1993-94 program; international activities, including the study of the Madrid Protocol implementation presented to the international community in a course at the University of Tasmania, and highlights of a CEMP Working Group meeting in Korea. Miscellaneous news items, and a short article on Cape Shirreff, including a sketch of same, conclude this bulletin.

A-49460

Berguño B., J., **South Shetland Islands: the sealing cycle**. 2 [Las Shetland del Sur: el ciclo lobero. 2], *Boletín antártico chileno*, Oct. 1993 12(2), p.2-9, In Spanish. 41 refs.

This is the second part of a review of the discovery of the South Shetland Is. and the sealing industry which developed at the time. This part relates details of the human presence on the islands since 1819, Palmer's discovery of the Antarctic Peninsula in 1820, and subsequent activities in the area. The events are related in chronological order, with dates and names of ships and explorers landing in the region following the discoveries, and the economical and political conditions in which they occurred.

A-49461

Carvalho Cruz, M.L., **Seventeenth Antarctic Treaty Consultative Meeting** [La XVII Reunión Consultativa del Tratado Antártico], *Boletín antártico chileno*, Oct. 1993 12(2), p.10-12, In Spanish.

The discussions at the 17th Antarctic Treaty Consultative Meeting, held in Venice, Italy, Nov. 11-20, 1992, are summarized. The

positions of different countries regarding the site selection for the Treaty's secretariat and that of the Environmental Protection Committee, antarctic tourism and non-government activities, the Protocol-Responsibility-Annex project, and the scientific and technological programs to be carried out in different disciplines by the international community in Antarctica, are outlined.

A-49464

Santiago de Chile. Instituto Antártico Chileno, **Boletín antártico chileno**, Vol.12, No.1, Apr. 1993, 36p., In Spanish. Refs. passim. For selected papers see A-49466 and B-49465.

This bulletin reviews the following: the tracking of humpback whales in the South Pacific Ocean; the history of South Shetland Is., including the intense hunting of seals in the 19th century; new perspectives in antarctic architecture, with photographs of model buildings; activities of the 1992-1993 Chilean research expedition to Antarctica, with outlines of various projects in biology, ecology, living resources, atmospheric and terrestrial physics, and geology; the inauguration of a new satellite (ERS/VLBI) receiving station at Bernardo O'Higgins; international activities, including the inauguration of a historical site at Cape Shirreff and details of the 1992 CCAMLR meeting. The bulletin concludes with highlights of a meeting on antarctic tourism and miscellaneous news.

A-49466

Berguño B., J., **South Shetland Islands: the sealing cycle**. 1 [Las Shetland del Sur: el ciclo lobero. 1], *Boletín antártico chileno*, Apr. 1993 12(1), p.5-15, In Spanish. 18 refs.

The history of the discovery of the South Shetland Is. is briefly reviewed, focusing on the development of the seal industry as early as the end of the 18th century, and describing the five devastating seal-hunting seasons between 1819 and 1824. The names of the ships carrying the slaughtering crews, and those of their captains and the countries from which they came, are identified. What is called the "sealing cycle" came to a definite conclusion by the 1880s, at which time the hunting of whales began.

A-49468

Korea Ocean Research and Development Institute, **Annual report 1992**, Ansan, 1992, 69p.

Research facilities and 1992 activities at the Institute, including polar research conducted at King Sejong Station, are summarized. Upper atmospheric physics data, and geological and geophysical data collected in the field during the 1991-1992 summer season, were analyzed and interpreted by the Polar Geological Sciences Laboratory. The Polar Ecology Laboratory conducted extensive investigations during the 1992-1993 season on antarctic marine and terrestrial biology. Details of the activities carried out at King Sejong Station and processed by the Polar Logistics Department are provided.

A-49470

Hicks, C., **Antarctic policy must balance research and environment**, *National Research Council. News report*, 1993 43(4), p.2-4.

This brief article presents highlights from a recent report by a committee of the National Research Council's Polar Research Board, which provides advice to policy-makers on how to respond to the protocol on environmental protection and evaluates how it might affect U.S. scientific programs in Antarctica.

A-49481

Window on Antarctica: an introduction to the Corporate Plan of the Australian Antarctic Division, Hobart, Australian Antarctic Division, 1991, 27p.

Australia's Antarctic Program is managed by the Antarctic Division of the Department of the Arts, Sport, the Environment, Tourism and Territories. This booklet provides an overview of the program, and includes information on the objectives and activities of the Division and its branches and sections. It is the first part of a series which together form the Division's Corporate Plan.

A-49491

Spude, C.H., Spude, R.L., **East Base Historic Monument. Stonington Island/Antarctic Peninsula**, Washington, D.C., U.S. Department of Interior, 1993, 168p., 31 refs.

In Oct. 1989 East Base, Stonington I., Antarctic Peninsula, was designated as a historic monument under the Antarctic Treaty. The United States, through the National Science Foundation, which manages the site, is mandated by the terms of the agreement to adopt all adequate measures to protect the cultural resources associated with East Base's significant history. With concern for the protection of the East Base Historic Monument as well as the necessity to remove debris and hazardous materials, the National Science Foundation requested the assistance of the National Park Service to prepare recommendations for the management of the site and its environmental cleanup. This report is a result of that cooperative effort, and it consists of Part 1: A guide for management, and Part 2: Description of the cultural resources and recommendations. Nine appendices are included.

B. BIOLOGICAL SCIENCES

B-47422

Barthel, D., **Do hexactinellids structure antarctic sponge associations**, *Ophelia*, Sep. 1992 36(2), p.111-118, 27 refs.

Underwater photography shows the existence of different sponge associations; species-poor associations are connected to soft bottom, species-rich associations exist on substrates characterized by bryozoan debris and especially sponge spicule mats. Trawl catches show differences in the population structure of a hexactinellid sponge, *Rossella racovitzae* Topsent at two stations, distinguishable from each other by substrate structure. On average small and therefore probably young specimens were found on bryozoan debris, while a population with larger and probably older specimens was found on solid hexactinellid spicule mats. These observations form the basis for the hypothesis that hexactinellid sponges are a major biological structuring agent for antarctic sponge associations; they colonize soft substrate and bryozoan debris-dominated areas and subsequently change the quality of the substrate by spicule deposition. The ensuing spicule mats are a suitable settling ground for a large number of demosponge species dependent on hard substrates. Mass occurrences of hexactinellids are also found in areas other than Antarctica. This phenomenon recognized in the Weddell Sea probably occurs more widely. (Auth. mod.)

B-47423

Tanimura, A., **Postembryonic development of *Paralabidocera antarctica* (I.C. Thompson) (Copepoda, Calanoida) from the fast ice near Syowa Station, Antarctica**, *Hydrobiologia*, Oct. 7, 1992 245(2), p.109-128, 18 refs.

Six nauplius and five copepodid stages as well as adults of *Paralabidocera antarctica* (I.C. Thompson, 1898) (Copepoda: Calanoida) are described based on specimens obtained from fast ice and collected by a plankton net near Showa Station. The adult male and female are redescribed in detail. Nauplius stages of *P. antarctica* are very similar to the previously described *Acartia* species. Sexual dimorphism becomes apparent from copepodid IV onwards in the morphology of antennule and leg 5. The copepodid stages of this species retain certain characteristics not only of *Acartiidae* but also of *Pontellidae* and *Parapontellidae*. (Auth.)

B-47435

Jordan, R.W., Ligowski, R., Nöthig, E.M., Priddle, J., **Diatom genus *Proboscia* in antarctic waters**, *Diatom research*, July 1991 6(1), p.63-78, Refs. p.75-78.

Sundström (1986) erected the genus *Proboscia* for solenoid diatoms whose valves tapered to a proboscis, but only assigned one species to it, the boreal *Rhizosolenia alata* Brightwell. Three species have been found in the modern antarctic phytoplankton that are affiliated with *Proboscia*. One is apparently identical to Sundström's *P. alata*, whilst *P. inermis* (Castracane) Jordan & Ligowski *comb. nov.* and *P. truncata* (Karsten) Nöthig & Ligowski *comb. nov.* are easily distinguished on the basis of valve and proboscis morphology. Winter and spring forms seem to be present in all three species, the winter forms being characterized by longer probosces; heterovalvar cells are not unusual. Terminal auxospores are documented for all three species. Similar fossil taxa may also be assignable to *Proboscia*. (Auth. mod.)

B-47436

Boyd, I.L., Croxall, J.P., **Diving behaviour of lactating antarctic fur seals**, *Canadian journal of zoology*, May 1992 70(5), p.919-928, With French summary. 25 refs.

The diving behavior of 11 lactating female antarctic fur seals was recorded for a total of 254 animal-days at sea. Median and maximum dive depths for individuals varied from 8 to 19 m and from 82-181 m, respectively, and median and maximum dive durations from 0.75-1.17 min and from 2.8-10.0 min, respectively. Theoretical aerobic diving limits were exceeded on <1% of dives. Dives were mainly V-shaped. Sixty percent of dives were to less than 20 m depth, and these dives were distinguished from deep dives (>20 m) by having slower rates of descent and ascent and by being confined to the mixed layer at the ocean surface, as judged by records of sea temperature obtained concurrently with records of depth. Dives were grouped into bouts, defined by inflexion points observed in the cumulative probability distribution of surface interval after probit transformation. Bouts (defined by preceding and succeeding surface intervals lasting 13-24 min) occurred within a diel pattern of diving activity, with 74-85% of dives occurring at night. The pattern of diving, in terms of division into bouts, showed greater differences between individual seals than did dive depth and duration. Dives tended to be shorter and shallower later in lactation. Most variation in diving behavior between individuals was in terms of the proportion of available time spent foraging, bout frequency, and bout duration. The foraging strategy in the antarctic fur seal is geared to exploiting prey within the surface mixed layer. (Auth.)

B-47437

Greenfield, L.G., **Nitrogen analyses of New Zealand and antarctic lichens**, *Lichenologist*, 1992 24(4), p.377-381, 10 refs.

The results of nitrogen (N) analyses of 14 New Zealand and 23 antarctic lichens are reported. Eight percent of the total lichen N occurs in the form of amino sugars, 5% as nucleic acids and 80% as proteins and amino acids. It is concluded that when lichens decompose they may represent a good N resource that may be important in ecosystems. (Auth.)

B-47442

U.S. Global Change Research Program, **GLOBEC: Southern Ocean Program; GLOBEC Workshop on Southern Ocean Marine Animal Populations and Climate Change**, *Global Ocean Ecosystems Dynamics. GLOBEC report*, Nov. 1991 No.5, 150p., Refs. passim.

From May 9-11, 1991 a workshop entitled "GLOBEC: Marine Animal Populations and Climate Change in the Southern Ocean" was held at Scripps Institution of Oceanography. This workshop was one in a series convened as part of the Global Ocean Ecosystems Dynamics (GLOBEC) initiative, which has as its general objective the understanding of processes relating to and controlling variability in marine populations. This report provides the results of the Southern Ocean Workshop. An executive summary summarizes the scientific issues addressed at the workshop and the major recommendations from the working groups. This is followed by a more detailed summary of the rationale, objectives and scientific questions set forth at the workshop. Discussions of the international aspects of a GLOBEC Southern Ocean initiative, field program logistics and data management needs are given in sections 4 to 6, respectively. The synopsis of the meeting

is followed by a series of overview papers from the plenary presentations that provide general background on many aspects of the physics and biology of the antarctic system. The reports of the working groups are given in Section 7 in their unabridged form to provide details of the discussions at the workshop from which recommendations were obtained. Finally, a glossary and list of meeting attendees are provided as appendices.

B-47452

Kuparinen, J., Bjørnsen, P.K., **Bottom-up and top-down controls of the microbial food web in the southern ocean: experiments with manipulated microcosms**, *Polar biology*, Sep. 1992 12(2), p.189-195, 25 refs.

Water from the Weddell Sea and Weddell Scotia Confluence was used for the experiments described. Microcosms were manipulated by nutrients and light, and by size-selective screening. Incubation at the higher light level doubled phytoplankton growth rates from 0.12 to 0.24/day in the Weddell experiment, and from 0.15 to 0.30/day in the Confluence experiment. Nutrient enrichment had no significant effect on growth rates in either of the experiments, indicating that phytoplankton growth was not nutrient-limited. In the microcosms, where dinoflagellate growth rate was different, high dinoflagellate numbers were reflected in depressed nanoflagellate growth as well as depressed growth of phytoplankton, suggesting that dinoflagellates controlled both heterotrophic nanoflagellates and autotrophic nanoplankton. Only during short periods, when dinoflagellate numbers were low, could exponential growth of nanoflagellates be demonstrated. Bacterioplankton growth rates were, on average, 0.26/day in the Weddell experiment and 0.22/day in the Confluence experiment. Bacteria were controlled by heterotrophic nanoflagellates. Potential growth rates up to 0.75/day were measured from batch cultures without predators. With the microcosm experiments, the authors could demonstrate a strong top-down control by dinoflagellates on phytoplankton and on heterotrophic nanoflagellates, and a control by heterotrophic nanoflagellates on bacteria. (Auth. mod.)

B-47453

Kuparinen, J., Bjørnsen, P.K., **Spatial distribution of bacterioplankton production across the Weddell-Scotia Confluence during early austral summer 1988-1989**, *Polar biology*, Sep. 1992 12(2), p.197-204, Refs. p.203-204.

Bacterioplankton production in the Weddell-Scotia Confluence seems to be driven by products from photosynthesis and heterotrophic processes, most likely grazing, which are tightly coupled to autotrophy. Quantitatively, bacterioplankton production was on an average 11% of net primary production, which is clearly a lower value than the 30% based on a review from temperate freshwater and marine ecosystems, but is comparable with values reported from the spring period in subarctic ecosystems. In comparison with the measurements of ETS, bacterioplankton contribution to community respiration was also lower than predicted from results from temperate ecosystems. It is concluded from these results and the results obtained from microcosm experiments (Bjørnsen and Kuparinen 1991b) that the flux of organic matter to eucaryote heterotrophs via bacterioplankton during spring and early summer periods in the southern ocean is of considerable, but not of equivalent importance, as in temperate waters. (Auth. mod.)

B-47454

Delille, D., **Marine bacterioplankton at the Weddell Sea ice edge, distribution of psychrophilic and psychrotrophic populations**, *Polar biology*, Sep. 1992 12(2), p.205-210, Refs. p.209-210.

In the eastern Weddell Sea on several transects, from ice-covered through ice melt to open-ocean stations, total and heterotrophic bacteria were estimated to document an enhanced bacteriological biomass expected near the ice edge. The highest numbers of bacteria

were found in melted ice cores. All quantitatively studied bacterial parameters were lower under the ice than in the ice samples, but there were no clear vertical gradients in the water column. In the studied spring situation, sea ice occurrence seems to play only a minor role in the general distribution of the seawater bacterioplankton. The bacterial community structure was investigated by carrying out 29 morphological and biochemical tests on 118 isolated strains. The bacterial communities inhabiting antarctic pack ice differ from those found in underlying seawater. Although non-fermentative Gram-negative rods were always dominant in seawater, *Vibrio* sp. represented more than 25% of the strains isolated from some ice samples. The results clearly indicated that a large majority of the bacteria isolated from seawater must be considered psychrotrophic, but that truly psychrophilic strains occur in melted ice and brine samples. (Auth. mod.)

B-47455

Becquevort, S., Mathot, S., Lancelot, C., **Interactions in the microbial community of the marginal ice zone of the northwestern Weddell Sea through size distribution analysis**, *Polar biology*, Sep. 1992 12(2), p.211-218, Refs. p.217-218.

Enumeration and identification of planktonic microorganisms (phytoplankton, bacteria, protozoa) were carried out for 16 stations sampled in the marginal ice zone of the northwestern Weddell Sea during sea-ice retreat in 1988. From these data, carbon biomass distribution among various classes, chosen according to size and trophic mode, has been determined. This analysis reveals the general dominance of nano-phytoplankton (74%), mainly *Cryptomonas* sp. In only two stations did significant microphytoplanktonic biomass occur. Bacterioplankton biomass was 16% of the phytoplanktonic biomass. Protozooplankton appeared as a significant group whose biomass represented an average of 23% of the total microbial biomass. Maximum phytoplankton and protozooplankton biomass was reached at about 100-150 km north of the receding ice edge, whilst bacteria did not show marked spatial variations. From these results, indirect evidence for close relationships between protozoa and bacteria, as well as protozoa and autotrophs, is given. (Auth. mod.)

B-47457

Bianchi, F., **Phytoplankton distribution in relation to sea ice, hydrography and nutrients in the northwestern Weddell Sea in early spring 1988 during EPOS**, *Polar biology*, Sep. 1992 12(2), p.225-235, Refs. p.234-235.

Phytoplankton biomass and distribution of major phytoplankton groups were investigated in relation to sea ice conditions, hydrography and nutrients along three north-south transects in the northwestern Weddell Sea in early spring 1988. Three different zones along the transect could be distinguished: the open water zone, the marginal ice zone, and the closed pack-ice zone. Nutrient concentrations increased towards the south, showing winter values under the closed pack-ice. Centric diatoms such as *Thalassiosira gravida* and *Chaetoceros neglectum* forming large colonies dominated the phytoplankton assemblage in terms of biomass in open water together with large, long chain forming, pennate diatoms, whereas small pennate diatoms such as *Nitzschia* spp. and nanoflagellates prevailed in ice covered areas. Fairly low concentrations of phytoplankton cells were encountered at the southernmost stations and many empty diatom frustules were found in the samples. The enhanced phytoplankton biomass in the Weddell-Scotia Confluence area is achieved through sea ice melting in the frontal zone of two different water masses, the Weddell and the Scotia Sea surface waters. (Auth. mod.)

B-47461

Sprong, I., Schalk, P.H., **Acoustic observations on krill spring-summer migration and patchiness in the northern Weddell Sea**, *Polar biology*, Sep. 1992 12(2), p.261-268, Refs. p.267-268.

Continuous acoustic observations with a 30 kHz and a 150 kHz echo-sounder were made from Nov. 1988 to Jan. 1989 on one repeatedly sampled transect, running along 49W from the open waters of the Scotia Sea into the Weddell Sea pack-ice. Swarm signals occurring on the echo records were mainly found in the upper 100 m of the water column, in size varying vertically from 1 to 70 m, and horizontally from less than 5 to over 3,000 m. Catches with a RMT 1+8 indicated that the observed swarm signals were most probably caused by krill. From late Nov. to early Jan. the swarms migrated northwards away from the ice-edge and towards greater depths, while simultaneously growing in size. The average number of swarms observed per 10 nautical miles along the transects remained fairly constant throughout the cruise, but the average swarm size and total aggregation size increased during the period studied. The echo data give evidence of the spring-summer migration of major parts of the krill stock from under the ice cover towards open waters. (Auth.)

B-47462

Dittrich, B.U., **Life under extreme conditions: aspects of evolutionary adaptation to temperature in crustacean proteases**, *Polar biology*, Sep. 1992 12(2), p.269-274, 26 refs.

The kinetic properties of a trypsin-like protease, based on cleavage of an artificial substrate, were investigated in several crustacean species from the Weddell Sea and compared to those obtained from species from tropical, temperate and subarctic regions. Decisive steps of thermal acclimation occurred in the lower temperature range, resulting in pronounced cold adaptation of the antarctic benthic species; this becomes evident from lowered activation energies of the trypsin-like proteases and in comparatively high enzymic activities at 0 C. In contrast, species living at high ambient temperatures are more favored by thermostability at higher temperatures rather than by a change of activation energy. (Auth.)

B-47463

Martínez, R., Estrada, M., **Respiratory electron transport activity of microplankton in the Weddell Sea during early spring: influence of the ice cover and the ice edge**, *Polar biology*, Sep. 1992 12(2), p.275-282, Refs. p.281-282.

During early spring the microplankton electron transport system (ETS) activity increased with time and in the pack ice-open water direction. The temporal trend was more obvious than the spatial one. ETS activity ranged from 0.01 to 1.25 ml O₂/cu m/h under the ice and from 0.1 to 1.6 ml O₂/cu m/h in the open water at the ice edge. ETS/Chl *a* ratios showed the importance of microheterotrophs under the ice, versus a greater phytoplankton dominance in the ice edge-open water zone. The carbon-specific activity reached a maximum (0.43/day) in the innermost zone of the CPI where bacteria dominated. Respiratory activity under the ice is important in producing the oxygen deficit observed, due to the negative balance between photosynthesis and respiration. The ETS activity was at the lower range of that found in the region in summer, and is comparable to that measured in other oligotrophic stratified systems in ocean areas. (Auth. mod.)

B-47464

Galéron, J., **Macrofaunal communities on the continental shelf and slope of the southeastern Weddell Sea, Antarctica**, *Polar biology*, Sep. 1992 12(2), p.283-290, 16 refs.

In the austral summer season of 1989, benthic macrofaunal communities were sampled from the Elephant I. area and from Kapp Norvegia to Halley Bay using a commercial bottom trawl and an Agassiz trawl. Thirty-six trawl samples from a depth range of about 200-2,000 m were considered, with most of the samples being from the shelf and upper slope. Multivariate analysis techniques (cluster-

ing and TWINSpan) discriminated between an eastern and a southern community in which parallel subgroups can be distinguished at increasing distances from the ice shelf. (Auth.)

B-47465

Gerdes, D., **Quantitative investigations on macrobenthos communities of the southeastern Weddell Sea shelf based on multibox corer samples**, *Polar biology*, Sep. 1992 12(2), p.291-301, 28 refs.

A total of 233 multibox corer samples from 36 stations along the southeastern Weddell Sea shelf and upper continent slope between Atka Bay and Gould Bay, covering a depth range from 170 to 2,037 m, provided biomass and abundance data for analysis of faunal communities. Twenty-eight major taxa were distinguished. Based on these data, 3 different macrobenthos communities could be identified by means of cluster analysis. Hexactinellid sponges, polychaetes and echinoderms were the most abundant. Biomass values have been found to be in the range of 94 mg up to 1.6 kg wet weight per sq m. According to TWINSpan, the sampled stations can be divided into two groups, each consisting of two major subgroups. Peracarid crustaceans, polychaetes and bivalves are commonly distributed in the area of investigation, whereas others such as sponges, brachiopods, pantopods and asteroids are more confined to Kapp Norvegia and Halley Bay. Biomass values of these latter taxa off Kapp Norvegia were generally higher than in the Halley Bay area. (Auth.)

B-47466

Hain, S., Arnaud, P.M., **Notes on the reproduction of high-antarctic molluscs from the Weddell Sea**, *Polar biology*, Sep. 1992 12(2), p.303-312, Refs. p.311-312.

The reproductive modes of 66 molluscan species from the Weddell Sea were investigated either by rearing of specimens in aquaria ("Neomeniomorphia" [Solenogastres], Polyplacophora and Gastropoda) or by studies of the larval shell (Bivalvia). The results show that not all marine invertebrates living in cold water environments produce large eggs, provide postspawning parental care, or lack planktonic larvae (Thorson's rule); and that brooding behavior is not always associated with small adult size. Several lecithotrophic (Solenogastres, Polyplacophora) and meroplanktonic, planktotrophic larvae (Gastropoda) were observed in aquaria. Investigations of the larval shell morphology indicate a planktotrophic or lecithotrophic larval stage in 27 Bivalvia species. With the exception of two species of meroplanktonic gastropod larvae, no developmental stages of benthic molluscs were ever found in plankton hauls in the Weddell Sea. This indicates that most larvae may live demersally. Brooding occurred in 1 Monoplacophora and 17 Bivalvia species. Intracapsular metamorphosis with very long embryonic development was observed in 15 Gastropoda species. (Auth.)

B-47467

Herman, R.L., Dahms, H.U., **Meiofauna communities along a depth transect off Halley Bay (Weddell Sea, Antarctica)**, *Polar biology*, Sep. 1992 12(2), p.313-320, 34 refs.

Meiofauna communities from 10 stations along a depth transect from approximately 500 to 2,000 m off the Halley Bay Station are investigated. Representatives of about 30 small taxa of higher category are found, most of them belonging to the meiofauna. Loricifera are recorded for the first time for the southern ocean. At one of the stations a maximum of 22 taxa occur; the mean number of taxa ranges from 7 to 16. Nematoda, Harpacticoida, Ostracoda, Polychaeta and Bivalvia are present at all sampling sites. Nematodes are always dominant, representing more than 90% of the individuals per sample, followed by harpacticoids (3%) and kinorhynchs (1.2%). Important fractions of the meiofauna (an average of more than 50%) occur in strata below the top 0-1 cm layer. Maximal density is 3,800 individuals/10 sq cm. Multivariate analysis (TWINSpan, Cluster analysis, DCA) discriminates among three communities which are

correlated with depth and sediment characteristics: the near shelf-ice, the slope, and the deep-sea communities. (Auth. mod.)

B-47468

Mathot, S., Dandois, J.M., Lancelot, C., **Gross and net primary production in the Scotia-Weddell Sea sector of the southern ocean during spring 1988**, *Polar biology*, Sep. 1992 12(2), p.321-332, Refs. p.331-332.

Daily rates of gross and net primary production were calculated in the Scotia-Weddell Sea sector of the southern ocean during spring 1988 on the basis of kinetic experiments, which combine radiotracer technology and classic biochemical procedures, and by taking into account the light regime, the physical structure of the water column, the vertical distribution of chlorophyll *a*, and the protozoan grazing pressure. From these calculations, three distinct sub-areas were identified: the Closed Pack Ice Zone (CPIZ), characterized by the lowest average gross primary production; the Marginal Ice Zone (MIZ); and the Open Ocean Zone off the ice edge (OOZ). Available light, strongly dependent on the ice cover, was shown to control the level of primary production in the sea ice associated sub-areas, whilst protozoa grazing on phytoplankton determined the moderate primary production level characteristic of the "well illuminated" OOZ area. (Auth. mod.)

B-47469

Kuosa, H., Norrman, B., Kivi, K., Brandini, F., **Effects of antarctic sea ice biota on seeding as studied in aquarium experiments**, *Polar biology*, Sep. 1992 12(3-4), p.333-339, 30 refs.

The potential seeding impact of sea ice microbial communities was studied during late austral winter-early spring 1988 in the Weddell Sea. Experiments were performed in seawater aquariums with natural seawater and seawater enriched with crushed ice. Algal, protozoan and bacterial cell numbers were followed, as well as nutrients and DOC levels. The results showed a potential seeding effect of sea ice communities to the water column. However, the type of ice communities differed greatly from each other and the effect of such seeding will be patchy. Seeding of seawater by ice rich in algae, flagellates and/or particulate organic carbon led to the development of communities dominated either by diatoms or bacteria. (Auth.)

B-47470

Fischer, G., Wiencke, C., **Stable carbon isotope composition, depth distribution and fate of macroalgae from the Antarctic Peninsula region**, *Polar biology*, Sep. 1992 12(3-4), p.341-348, Refs. p.347-348.

Stable carbon isotope composition of macroalgae collected at King George I. ranged from -8 per mill to -34 per mill. It is hypothesized that the $\delta^{13}C$ values are related to the depth distribution: species inhabiting greater depth had much lower values (around -30 per mill) compared to species from shallower waters (around -17 per mill). Isotopic studies on sediment trap samples from the King George Basin (2,000 m deep) revealed that benthic macroalgae contributed strongly to the total organic carbon pool of the deeper basin waters during austral spring and summer. Fragments of brown macroalgae (Desmarestiales) were detected in microscopical analyses of semi-thin sections of sediment samples from the Bransfield Strait. Possible mechanisms regarding the erosion of benthic macroalgae and their transport to the deeper waters and to the sediment are summarized. (Auth.)

B-47471

Guinet, C., Jouventin, P., Weimerskirch, H., **Population changes, movements of southern elephant seals on Crozet and Kerguelen Archipelagos in the last decade**, *Polar biology*, Sep. 1992 12(3-4), p.349-356, Refs. p.355-356.

The elephant seal populations breeding on the Crozet and Kerguelen Archipelago were surveyed during the eighties. Elephant seals were observed moving between Kerguelen, Amsterdam, Heard Is. and Vestfold Hills and between Crozet and Prince Edward Archipelagos. No exchanges were observed between Crozet and Kerguelen Archipelagos, suggesting that the two populations are more isolated than previously stated. On the Crozet Archipelago since 1966 the Possession I. population showed a 70% reduction in numbers of cows ashore and the population is still decreasing. On Kerguelen I. there has been a decline of 44% from 1956 to 1989, but the population appears to have stabilized since 1984. It is suggested that elephant seal populations in the Indian Ocean may have been affected by a change at the trophic level over the last four decades. But the highest rate of decrease observed on the Crozet Archipelago and the fact that the population is still decreasing may be explained by additional factors, in particular by killer whale predation. (Auth.)

B-47472

Abelmann, A., **Radiolarian flux in antarctic waters (Drake Passage, Powell Basin, Bransfield Strait)**, *Polar biology*, Sep. 1992 12(3-4), p.357-372, Refs. p.371-372.

The study of radiolarians collected during sediment trap experiments in the Drake Passage, the northern Powell Basin and the King George Basin of the Bransfield Strait provides new information on the fluxes of radiolarian shells in antarctic waters, on the annual flux pattern, the species distribution and its ecological significance, and on alteration processes of the radiolarian shells in the water column and at the sediment/water interface. Significant lateral transport of radiolarians was documented during the austral summer in the Bransfield Strait by a factor of 10 increase of the radiolarian flux in the lower portion of the water column and the species composition trapped in deeper waters. Radiolarian assemblages associated with pelagic and neritic environments characterized by typical antarctic taxa (*Antarctissa* spp.) and a group of species with bipolar distribution (e.g. *Plectacantha oikiskos*, *Phormacantha hystrix*), respectively, are distinguished. While the signal of polycystine radiolarians is relatively well recorded in the sediments, the shells of phaeodarians are almost completely dissolved during settling through the water column. (Auth. mod.)

B-47473

Abelmann, A., **Radiolarian taxa from southern ocean sediment traps (Atlantic sector)**, *Polar biology*, Sep. 1992 12(3-4), p.373-385, Refs. p.384-385.

This study gives a first inventory of radiolarian taxa collected with sediment traps in Drake Passage, Powell Basin and Bransfield Strait. It includes 66 taxa or taxa groups of which 46 were already described. Two previously described species groups and 20 as yet undescribed taxa are documented. The name *Protocystis bicornis* (Haecker) is replaced by *P. spinosus*, as it is a later homonym of *P. bicornis* (Borgert). The occurrence pattern of the radiolarian taxa indicates distinct differences in the species composition between neritic environments (Bransfield Strait and Powell Basin) and pelagic open ocean conditions (Drake Passage). (Auth.)

B-47474

Davidson, A.T., Marchant, H.J., **Protist abundance and carbon concentration during a *Phaeocystis*-dominated bloom at an antarctic coastal site**, *Polar biology*, Sep. 1992 12(3-4), p.387-395, Refs. p.394-395.

Changes in the concentrations of bacteria, phytoplankton, protozoa, dissolved organic carbon (DOC), particulate organic carbon, particulate carbohydrate and particulate organic nitrogen were followed throughout the summer in Prydz Bay. The colonial prymnesiophyte *Phaeocystis pouchetti* was the first major phytoplankton species to bloom, and remained numerically dominant for most of the summer. During the *P. pouchetti* bloom the concentration of most other autotrophs did not increase. Microheterotroph abundance peaked during

or immediately after the *Phaeocystis* bloom. Their peak coincided with very high concentrations of organic carbon, particularly DOC which exceeded 100 mg/l, and low bacterial abundance. Maximum bacterial abundance was reached after the decline in microheterotroph numbers. Bacterial utilization of carbon substrates and microheterotroph grazing of bacteria and uptake of DOC may form an important link to higher trophic levels during antarctic *Phaeocystis* blooms. (Auth.)

B-47475

Schwarz, A.M.J., Green, T.G.A., Seppelt, R.D., **Terrestrial vegetation at Canada Glacier, southern Victoria Land, Antarctica**, *Polar biology*, Sep. 1992 12(3-4), p.397-404, 37 refs.

Bryophyte flushes in the vicinity of Canada Glacier in Taylor Valley were investigated in order to describe the vegetation present and to investigate factors affecting vegetation distribution. Biomass values from 950 to 1,250 g/sq m (dry weight) and vegetated areas up to 14,450 sq m indicate this is a significant area of bryophyte growth in southern Victoria Land. The pattern of plant species in relation to water flow was investigated through detailed mapping. This is the first confirmed identification of *Bryum argenteum* and *Pottia heimii*, and the first report of *Bryum pseudotriquetrum* from this area. Tissue nitrogen values for plants at this site are lower than in other reported data, but it seems unlikely this would be a limiting factor for growth. It is concluded that, in this area, summer water flow in conjunction with microtopography has the greatest influence in determining where mosses, cyanobacteria and algae grow. (Auth.)

B-47476

Laybourn-Parry, J., Marchant, H.J., **Microbial plankton of freshwater lakes in the Vestfold Hills, Antarctica**, *Polar biology*, Sep. 1992 12(3-4), p.405-410, 37 refs.

The plankton of 12 freshwater and slightly saline lakes in the Vestfold Hills was sampled in Feb. 1991. All of the lakes are oligotrophic. The chlorophyll *a* concentrations in the lakes ranged from 0.10-2.69 micrograms/l. The majority of the phytoplankton were flagellates or picoplanktonic cyanobacteria, with the species composition varying between the lakes. Cyanobacteria were found in 5 of the lakes. Five to 6 species of ciliated protozoa occurred, among them oligotrichs, including the microtrophic species *Strombidium viride*. The concentrations of protists and bacteria were an order to several orders of magnitude lower than reported from lower-latitude oligotrophic lakes. Low species diversity and low numbers in the plankton characterize these East Antarctica lakes, which reflects their low nutrient status and isolation. (Auth.)

B-47477

Laybourn-Parry, J., Marchant, H.J., Brown, P.E., **Seasonal cycle of the microbial plankton in Crooked Lake, Antarctica**, *Polar biology*, Sep. 1992 12(3-4), p.411-416, 39 refs.

Changes in the abundance of the components of the microbial plankton between July 1990 and Mar. 1991 in Krok Lake, one of the largest and deepest freshwater lakes in Antarctica, are described. Chlorophyll *a* concentration is low and there is no discernible spring increase. The phytoplankton is largely dominated by flagellates. Bacterioplankton exhibits a seasonal pattern of abundance, probably related to temperature and grazing by heterotrophic and mixotrophic flagellates. Total flagellated protozoan concentrations ranged between 25-13,600/l. Autotrophic and heterotrophic flagellate abundances were coupled and peaks in their abundance oscillated with peaks in bacterioplankton concentration. Four species of ciliated protozoa, dominated by oligotrichs, particularly the plastidic *Strombidium*, inhabit the lake. The plankton is characterized by the presence of flocs which act as loci for bacteria, flagellates and amoebae and feeding sites for the ciliates and the two sparse metazoan components of the plankton. Krok Lake is extremely oligotrophic, but nonetheless

supports a plankton community with a low species diversity and simple trophodynamics. (Auth. mod.)

B-47478

Horner, R., Ackley, S.F., Dieckmann, G.S., Gulliksen, B., Hoshiai, T., Legendre, L., Melnikov, I.A., Reeburgh, W.S., Spindler, M., Sullivan, C.W., **Ecology of sea ice biota. 1. Habitat, terminology, and methodology**, *Polar biology*, MP 3189, Sep. 1992 12(3-4), p.417-427, Refs. p.424-427.

Polar regions are covered by extensive sea ice that is inhabited by a variety of plants and animals. The environments where the organisms live vary depending on the structure and age of the ice. Many terms have been used to describe the habitats and the organisms. The authors here characterize the habitats and communities and suggest some standard terms for them. They also suggest routine sampling methods and reporting units for measurements of biological and chemical variables. (Auth.)

B-47479

Legendre, L., Ackley, S.F., Dieckmann, G.S., Gulliksen, B., Horner, R., Hoshiai, T., Melnikov, I.A., Reeburgh, W.S., Spindler, M., Sullivan, C.W., **Ecology of sea ice biota. 2. Global significance**, *Polar biology*, MP 3190, Sep. 1992 12(3-4), p.429-444, Refs. p.441-444.

Sea ice not only determines the ecology of ice biota, but also influences the pelagic systems under the ice cover and at ice edges. In this paper, new estimates of arctic and antarctic production of biogenic carbon are derived, and differences as well as similarities between the two oceans are examined. In ice-covered seas, high algal concentrations (blooms) occur in association with several types of conditions. Blooms often lead to high sedimentation of intact cells and faecal pellets. A fraction of the carbon fixed by microalgae that grow in sea ice or in relation to it is exported out of the production zone. This includes particulate material sinking out of the euphotic zone, and also material passed on to the food web. Pathways through which ice algal production does reach various components of the pelagic and benthic food webs, and through them such top predators as marine mammals and birds, are discussed. Processes that favor the production and accumulation of biogenic carbon as well as its export to deep waters and sequestration are discussed, together with those that influence mineralization in the upper ice-covered ocean. (Auth. mod.)

B-47480

Hansson, L.A., Håkansson, H., **Diatom community response along a productivity gradient of shallow antarctic lakes**, *Polar biology*, Sep. 1992 12(3-4), p.463-468, 19 refs.

Antarctic lakes are simple ecosystems ranging in productivity from extremely low productive melt-water lakes to highly productive guano lakes. With the aim to assess the importance of environmental variables for species composition and abundance of periphytic diatoms, the authors quantified light availability and nutrient concentration in the water and in the sediment of 21 antarctic lakes. Of a total of 66 diatom taxa identified, the distributions of 16 species were investigated in detail. Four of these (25%) showed highest abundance in highly productive lakes (low light/high nutrient availability), whereas 3 species (19%) increased in abundance as productivity decreased (high light/low nutrient availability). Some ecological theories predict that species richness shows a maximum in medium productive systems and a decreasing trend as productivity increases further due to competition. Other theories suggest that physical factors, including climate, are the major factors determining species richness. The results from this study suggest that none of the theories is completely wrong or right, but that they have to be combined to explain as much as possible of the variation in species richness. (Auth.)

B-47481

Skóra, K.E., Neelov, A.V., **Fish of Admiralty Bay (King George Island, South Shetland Islands, Antarctica)**, *Polar biology*, Sep. 1992 12(3-4), p.469-476, Refs. p.475-476.

The species composition of the ichthyofauna of Admiralty Bay was determined from results of sampling using bottom trawls, gill-nets and long lines. Thirty-five species from 24 genera and 10 families were found. The number of species increased with depth, a tendency characteristic of antarctic waters. In the Bay, the catch rate obtained with a bottom trawl was roughly 10 times lower than the catch rate using the same gear on the shelf around King George I. *Notothenia gibberifrons* was the dominant species in all trawls. The majority of the fish of species *N. coriiceps neglecta*, *N. rossii marmorata*, *N. nudifrons*, *Trematomus newnesi* and *T. bernacchii* preferred waters about 255 m deep. Fourteen specimens of a previously undescribed species of the genus *Psilodraco* were caught in the bay within the 146 to 540 m depth range. The rare zoarcid *Lycenchelys aratrirostris* was also caught in Admiralty Bay; previously this species had only been reported from the Elephant I. region. In the case of *T. newnesi*, the occurrence of scales in the interorbital space was noted, an observation which verifies this feature as a distinct taxonomical criterion for this species. (Auth. mod.)

B-47486

Franzmann, P.D., Dobson, S.J., **Cell wall-less, free-living spirochetes in Antarctica**, *Federation of European Microbiological Societies. FEMS microbiology letters*, 1992 97(3), p.289-292, 17 refs.

The phylogeny of an antarctic cell wall-less bacterial strain was determined by sequencing PCR amplified 16S rDNA, and comparison of the sequence with other bacterial 16S rRNA sequences available in databanks. Although the strain was phenotypically very similar to members of the genus *Anaeroplasm*, phylogenetic analyses showed it to be a member of the order Spirochaetales. Until now, the order was one of the few bacterial orders in which phylogeny was reflected in a uniform morphology of its members. The viability of wall-less cells in cultures of spirochetes and spirochetal infective material warrants reinvestigation. (Auth.)

B-47489

Testa, J.W., Rothery, P., **Effectiveness of various cattle ear tags as markers for Weddell seals**, *Marine mammal science*, Oct. 1992 8(4), p.344-353, 10 refs.

Rates of tag loss were estimated for metal and several varieties of plastic cattle ear tags in a long-term population study of Weddell seals. Methods for estimating tag loss and sightability of tags are presented. Tags were lost at a higher rate in the first year after application than in subsequent years, and pups lost tags at a higher rate than older seals given the same tag types. Medium-sized plastic tags (Dalton, Allflex and Fearing) were retained at higher rates and were overlooked less frequently than metal tags on adult seals. Dalton Jumbo Rototags showed the lowest loss rates on pups in comparison to larger, flexible plastic tags, but were harder to read in the field. (Auth.)

B-47492

Ricker, R.W., **Taxonomy and biogeography of Macquarie Island seaweeds**, London, British Museum (Natural History), 1987, 344p., Refs. p.308-326.

DLC QK577.R53

In spite of Macquarie Island's continuous isolation since its volcanic emergence above sealevel less than one million years ago, it has been colonized by numerous land and sea plants. As a result of the present survey, 103 species representing 81 genera and 43 families of benthic marine algae are documented from this vicinity. Of these species, 15 belong to the Chlorophyta, 28 to the Phaeophyta and 60 to the Rhodophyta. Approximately 70 are reported from Macquarie I. for the first time, with 11 of these newly described. The new taxa

include one species in the Chlorophyta (*Derbesia furcata*), 4 in the Phaeophyta (*Dilophus decumbens*, *Haplogloia moniliformis*, *Lithoderma piliferum* var. *debile* and *Streblonema codiatile*) and 4 in the Rhodophyta (*Porphyra plocamiestris*, *P. ionae*, *Iridaea remuliformis* and *Antithamnionella alternans*). Two additional unpublished taxa in the Chlorophyta (*Codium subantarcticum* and *Endophyton atroviridis*) are also included but not formally described. *Gononema pectinatum* and *G. ramosum* are transferred from the Ectocarpaceae to the Elachistaceae, and *Desmarestia rossii* is synonymized with *D. chordalis*. The new name *Rhodymenia subantarctica* is proposed for *R. cuneifolia* (Hooker f. & Harvey) Taylor, which is a later homonym of *R. cuneifolia* Okamura. *Delesseria lancifolia* is emended to include branched and unbranched thalli, with *D. belayevii* and *D. uschakovii* considered to be later synonyms. *Pseudophycodrys* is conceived as monotypic and restricted to subantarctic waters. (Auth. mod.)

B-47493

Hertel, H., **Progress and problems in taxonomy of antarctic saxicolous lecideoid lichens**, Progress and problems in lichenology in the eighties, edited by E. Peveling, Berlin, J. Cramer, 1987, p.219-242, 8 refs.

DLC QK580.74.P76

A historical review of the genus concept in *Lecidea*, and comments on the changing evaluation of certain taxonomic characters are given. Zahlbruckner's excipulum types ("biatorine, lecideine, lecanorine") are unsuitable primary characters, because of convergence and reduction. On the other hand, conidiophore characters, ascus apical structures and chemistry provide valuable taxonomic characters; photobiont specificity and ascocarp ontogenetic developmental types need further investigation. Species and especially genera of a local distribution are located mainly in the subantarctic zone of the antarctic floral region. By contrast, in continental Antarctica, although endemic species occur, endemic genera seem to be very rare or absent, thus indicating a relatively young flora. Antarctic nunataks and ice-free coastal margins are comparatively rich in widespread oreophytes, many of which have presumably arrived by long-range dispersal of airborne ascospores. (Auth. mod.)

B-47494

Kappen, L., Bölter, M., Kühn, A., **Photosynthetic activity of lichens in natural habitats in the maritime Antarctic**, Progress and problems in lichenology in the eighties, edited by E. Peveling, Berlin, J. Cramer, 1987, p.297-312, 19 refs.

DLC QK580.74.P76

Over a period of 30 days, field measurements were carried out near Arctowski Station on a rock colonized by about 15 species of lichens. Microclimate and CO₂ gas-exchange of lichens were recorded on two faces. The principal parameters measured in *Usnea antarctica* were photosynthetically active radiation, air and thalli temperatures and, in some cases, the water relations in the thalli. Carbon dioxide gas-exchange was measured by means of a system comprising an infrared gas analyzer and a Siemens temperature-controlled gas-exchange chamber. The system was specially constructed for use in the Antarctic. Tests were conducted with a CO₂/H₂O porometer to evaluate the relationship between net photosynthesis and the water content of the thalli. Preliminary results of field measurements with six lichen and one algal species are presented, and comparisons with laboratory measurements at Kiel and earlier microclimatological measurements from Fildes Peninsula are made. (Auth.)

B-47495

Galloway, D.J., **Austral lichen genera: some biogeographical problems**, Progress and problems in lichenology in the eighties, edited by E. Peveling, Berlin, J. Cramer, 1987, p.385-399, Refs. p.393-399.

DLC QK580.74.P76

Biotas of cool-temperature regions of the Southern Hemisphere show striking affinities and similarities, reflecting southern Gondwanaland ancestry prior to rifting and continental drift. Lichens as a major Southern Hemisphere plant group have a well-defined austral element, comprising both palaeoaustral and neoaustral groupings. Palaeoaustral taxa represent remnants of the former panaustral cool-temperate vegetation of the Panthalassic margin of Gondwanaland, and comprise some 45 genera of crustose, foliose and fruticose life forms. These taxa show disjunct distributions; a preference for cool-temperate forests, or subalpine shrubland or grassland habitats; often have a high degree of fertility; lack vegetative diaspores and have been flexible enough to colonize and/or recolonize habitats after periods of climatic deterioration. Neoaustral taxa are those dispersed much later, mainly post-Oligocene, after the separation of the major southern landmasses, using the West Wind Drift and circum-antarctic oceanic current to cross areas of deep ocean. The austral element in Southern Hemisphere lichenology is discussed in general terms and in the light of recent research into major southern cool-temperate genera such as *Pseudocyphellaria*. (Auth.)

B-47496

Cooper, J., Henley, S.R., Klages, N.T.W., **Diet of the Wandering Albatross *Diomedea exulans* at subantarctic Marion Island**, *Polar biology*, Oct. 1992 12(5), p.477-484, 42 refs.

The diet of the Wandering Albatross at Marion I. was studied by inducing recently fed chicks to regurgitate and by stomach flushing adults about to feed chicks. Liquid comprised 70.2% of stomach content mass recovered from chicks. Solid material comprised cephalopods (58.6% by mass), fish (36.5%) and crustacean, cetacean and seabird material as minor items. Twenty-three taxa of cephalopods were identified, the onychoteuthid squid *Kondakovia longimana* being the most important. Estimated average mass of squid was 694 g with a maximum of over 8 kg. Diet of the Wandering Albatross at Marion I. was broadly similar to that at other studied localities. The high proportion in the diet of cephalopods known to float after death, and the deep-water habits of the few fish identified, suggest that scavenging plays an important role in foraging behavior. (Auth.)

B-47497

Lizotte, M.P., Sullivan, C.W., **Photosynthetic capacity in microalgae associated with antarctic pack ice**, *Polar biology*, Oct. 1992 12(5), p.497-502, 35 refs.

Previous studies of primary production in antarctic seas have concluded that microalgae associated with sea ice make only a minor contribution to the carbon budget; however, production estimates for sea ice algae have been based almost exclusively on microalgae from nearshore fast ice. The authors measured biomass and rates of photosynthesis (at saturating irradiances) in microalgae collected from offshore pack ice during 4 cruises to the Weddell-Scotia Sea and the region west of the Antarctic Peninsula. Chlorophyll *a* concentrations in pack ice (0.089 to 260 micrograms/l) were as high as reported from fast ice. The photosynthetic capacities are approximately an order of magnitude greater than previously reported for fast ice microalgae, but are similar to rates reported for antarctic phytoplankton. Because pack ice constitutes more than 90% of the ice cover in antarctic seas, and indigenous microalgae have a higher photosynthetic capacity than previously realized, the authors raise the question: has the importance of sea ice algae to primary production in the southern ocean been underestimated? (Auth. mod.)

B-47498

Davis, L.S., Miller, G.D., **Satellite tracking of Adélie penguins**, *Polar biology*, Oct. 1992 12(5), p.503-506, 24 refs.

The first successful attempt to track penguins at sea using satellite telemetry is described. Four females from James Ross I. foraged in

different locations, dispelling the notion of a common feeding ground. They moved up to 272 km from the rookery and covered from 0.551 to 1.121 km on their trips, swimming at minimum average speeds around 1.2 m/s. The birds were most likely to be in the water between 0630 and 1430 hrs when light intensity, important for a visual predator, was greatest. Carrying the transmitters reduced the rates of fat deposition (weight gain), increasing the duration of foraging trips of females; this suggests that they may forage until their fat depots reach a minimum threshold level. This has two implications: durations of these postlaying foraging trips could potentially be used as an indicator of krill abundance, the almost exclusive food of Adélie penguins during this period; and any reduction in krill stocks caused by harvesting could increase foraging trip durations with a concomitant increase in breeding failures. (Auth. mod.)

B-47499

Sluys, R., **Synopsis of antarctic plagiostomids (Platyhelminthes, Prolecithophora), with the description of a new species and remarks on taxonomy, phylogeny, and biogeography**, *Polar biology*, Oct. 1992 12(5), p.507-518, 29 refs.

A synopsis is provided of the antarctic plagiostomid flatworms of the genera *Plagiostomum*, *Plicastoma*, and *Haplophorum*, including one new species, *Plagiostomum giganteum* sp. nov. A phylogenetic analysis is performed on the *Plagiostomum* group, comprising the genera *Plicastoma*, *Haplophorum*, *Acmostomum*, *Tuilica*, and *Plagiostomum*. The analysis is based on 12 terminal taxa and 6 characters. The phylogenetic tree proposed has a length of 10 steps and a consistency index of 0.60. The monotypic genus *Tuilica* grouped with representatives of *Acmostomum*, and it is therefore suggested that *T. evelinae* is best considered as a species of *Acmostomum*. In the phylogenetic tree the genus *Plicastoma* is positioned at the outgroup node. *Plagiostomum* is the sister genus of *Haplophorum* and *Acmostomum* together, and these last two are sister groups. Generalized distribution maps are given for the genera *Haplophorum*, *Acmostomum*, *Plicastoma*, and *Plagiostomum*. (Auth.)

B-47500

Chown, S.L., Van Drimmelen, M., **Water balance and osmoregulation in weevil larvae (Coleoptera: Curculionidae: Brachycerinae) from three different habitats on subantarctic Marion Island**, *Polar biology*, Oct. 1992 12(5), p.527-532, Refs. p.531-532.

Ectemnorhine weevils are the most successful group of beetles in the subantarctic region, which is undoubtedly due partly to the ability of these weevils to tolerate a wide variety of abiotic conditions. In the laboratory, larvae of 3 species of ectemnorhine weevils from 3 diverse habitats on Marion I., were exposed to desiccating conditions and to water of two different salinities to elucidate the physiological basis of their ability to tolerate various abiotic conditions. In the desiccation experiment the supralittoral *Palirhoeus eatoni* larvae lost water faster than larvae of the "inland" epilithic species, *Bothrometopus randi* Jeannel, and could not fully replenish lost water by drinking. However, larvae of *P. eatoni* showed greater osmoregulatory ability than the latter species when exposed to hypo- and hyperosmotic conditions. The detritus-dwelling larvae of *Ectemnorhinus similis* C.O. Waterhouse showed rates of water loss similar to those of the *B. randi* larvae in the desiccation experiment, but took longer to replace lost water by drinking. All 3 species showed little change in haemolymph water activity despite approximately 28% reduction in water content during desiccation. (Auth. mod.)

B-47501

Ekelund, N.G.A., **Studies on the effects of UV-B radiation on phytoplankton of subantarctic lakes and ponds**, *Polar biology*, Oct. 1992 12(5), p.533-537, 27 refs.

Experiments were performed to determine the effects of UV-B radiation on motility and growth of phytoplankton from lakes and ponds in South Georgia. After 4 h of solar radiation and 4 h artificial radiation the swimming velocity of *Cryptomonas* sp. decreased. The growth rate of *Botryococcus*, *Lyngbya* sp. and *Staurastrum* sp. did not show any significant variations between the different light conditions. The UV-B component was reduced by filtering solar radiation through glass bottles and cellulose acetate. Cloudy days had only 30% of the radiation of clear days in both the PAR (photosynthetic active radiation) and UV-B regions. The ponds contained large amounts of humic substances, which are responsible for the absorbance in the UV region. (Auth.)

B-47502

Watanuki, Y., Mori, Y., Naito, Y., **Adélie Penguin parental activities and reproduction: effects of device size and timing of its attachment during chick rearing period**, *Polar biology*, Oct. 1992 12(5), p.539-544, 25 refs.

Effects of device attachment on parental activities and body mass change in instrumented birds and their mates, and chick growth and survival, were studied in Adélie penguins in Lützow-Holm Bay. Penguins on which small devices were fitted with rubber band harnesses exhibited increased foraging trip duration, and decreased body mass, food delivery rate, chick growth and chick survival. Their mates did not increase food delivery rate. Those on which small or large devices were fitted with epoxy glue did not change foraging trip duration, body mass, or chick survival. However, large devices decreased chick growth. These effects were more obvious among penguins fitted with devices later in the chick rearing period, and suggest that parents fitted with devices give a priority to maintenance of their own energy reserve over guarding and food delivery for chicks; and parents' decreasing energy reserves later in the breeding season might intensify the effects of attached devices. (Auth.)

B-47505

Johnston, C.G., Vestal, J.R., **Biogeochemistry of oxalate in the antarctic cryptoendolithic lichen-dominated community**, *Microbial ecology*, 1993 25(3), 207p., 44 refs.

Cryptoendolithic (hidden in rock) lichen-dominated microbial communities from the McMurdo Dry Valleys were shown to produce oxalate (oxalic acid). Oxalate increases mineral dissolution, which provides nutrients, creates characteristic weathering patterns, and may ultimately influence the biological residence time of the community. Oxalate was the only organic acid detectable by HPLC, and its presence was verified by GC/MS. Community photosynthetic metabolism was involved in oxalate production since rates of C14-oxalate production from CO₂-14 were higher in light than in dark incubations. Flaking of the sandstone at the level of the lichen-dominated zone a few millimeters beneath the rock surface can be explained by dissolution of the sandstone cement, which was enhanced by Si, Fe, and Al oxalate complex formation. Added oxalate increased the solubility of Si, Fe, Al, P, and K. The ability of oxalate to form soluble trivalent metal-oxalate complexes correlated with the observed order of metal oxide depletion from the lichen-dominated zone (Mn > Fe > Al). Thermodynamic calculations predict that Fe oxalate complex formation mobilizes amorphous Fe oxides (ferrihydrite) in the lichen-dominated zone, and where oxalate is depleted, ferrihydrite should precipitate. Hematite, a more crystalline Fe oxide, should remain solid at *in situ* oxalate concentrations. Oxalate was not a carbon source for the indigenous heterotrophs, but the microbiota were involved in oxalate mineralization to CO₂, since oxalate mineralization was reduced in poisoned incubations. (Auth. mod.)

B-47508

Trueb, L.F., **Lichens in the maritime antarctic** [Flechten in der maritimen Antarktis], *Naturwissenschaftliche Rundschau*, July 1992 45(7), p.266-268, In German.

Lichens are extremely plentiful throughout Antarctica wherever there is summer ice or snow-free ground. With over 400 species, they are a larger group than all other life forms. Along with algae and fungi they are successful symbiotic organisms. Globally they comprise about 20,000 species whose range extends almost from pole to pole. Some lichen characteristics, as metabolism and propagation, symbiotic success, field and lab measurements are discussed.

B-47520

Meadows, J., **Environmental management in Antarctica: a guide to the literature resources**, *Ohio State University. Byrd Polar Research Center. BPRC report*, 1992 No.4, Polar Libraries Colloquy, 14th, Columbus, OH, May 3-7, 1992. Proceedings. Edited by L.B. Lay and L.T. Everett. International sharing of polar information resources, p.229-241, 58 refs.

The drafting of the Environmental Protocol to the Antarctic Treaty punctuated a growing body of scholarly research and official recommendation. This paper is intended to help the information professional identify and acquire information on environmental management in Antarctica. It is not comprehensive, but offers instead a selection of sources. (Auth.)

B-47524

Putt, M., Stoecker, D.K., Altstatt, J., **Bacterivory in McMurdo Sound: 1. Grazing by heterotrophic nanoflagellates**, *Antarctic Journal of the United States*, 1991 26(5), p.139-140, 7 refs.

Seasonal patterns of bacterivory by nanoflagellates were estimated in samples collected from a depth of 25 m at the land-fast ice edge in McMurdo Sound between Nov. 23, 1990, and Jan. 23, 1991. The sampling interval encompassed the annual *Phaeocystis pouchettii* bloom. It was found that at a depth of 25 m, bacteria and heterotrophic nanoflagellates had similar seasonal trends, tending to increase in abundance from late Nov. until late Dec./early Jan. and subsequently declining through Jan. The heterotrophic nanoflagellate community was consistently dominated numerically by small aloricate cells less than 5 microns in diameter. Even using the maximum clearance rates, the grazing impact of the heterotrophic nanoflagellate community was equivalent to more than 20% of bacterial standing stock only during late Dec. and early Jan. Throughout the rest of the season, heterotrophic nanoflagellate grazing was low (generally less than 10% of the bacteria standing stock each day). As in temperate regions, heterotrophic nanoflagellates appear specialized for grazing on bacteria-sized particles. It was found, however, that the grazing impact of the heterotrophic nanoflagellate community was small during much, if not all, of the summer season in McMurdo Sound.

B-47525

Moisan, T., Putt, M., Stoecker, D.K., **Bacterivory in McMurdo Sound: 2. Information from size-fractionation experiments**, *Antarctic Journal of the United States*, 1991 26(5), p.141-142, 10 refs.

Several studies have suggested that protozoan grazing influences the population dynamics of bacteria in polar systems. Here, the authors used size-fractionation to estimate bacterivory in McMurdo Sound. Water samples were collected from 5 and 100 m at the ice edge in McMurdo Sound on 8 occasions between late Nov. 1990 and mid-Jan. 1991. The sampling period comprised the annual *Phaeocystis pouchettii* bloom. Bacterial abundance and chlorophyll concentrations varied over an order of magnitude during the study. Growth rates of bacteria in the <1 micron fraction did not exceed 0.26 per day (i.e., a minimum doubling time of 2.7 days) and were frequently not significantly different from zero. These growth rate estimates for bacteria in the <1 micron fraction are consistent with the lower range of growth rate estimates for phytoplankton in McMurdo Sound previously determined using thymidine assimi-

tion. Using the size-fractionation technique, the authors were generally unable to detect bacterivory.

B-47526

Stoecker, D.K., Buck, K.R., Putt, M., **Photosynthetic dinoflagellates and their cysts characteristic of the land-fast ice**, *Antarctic Journal of the United States*, 1991 26(5), p.143-144, 8 refs.

During late austral spring and early summer of 1990-1991, the authors sampled the brine from the upper 50 cm of the approximately 175 cm of annual ice in McMurdo Sound, using previously described techniques. Sampling locations were distributed throughout McMurdo Sound; 12 were on the east side and 7 on the west side of McMurdo Sound. At all locations, athecate photosynthetic dinoflagellates and/or their cysts were observed, which together accounted for 82% in Dec. and 54% in Jan. 1991 of the autotrophic biomass in the brine. The most common dinoflagellate was a small (approximately 6x10 micron) photosynthetic gymnodinoid species. The dinoflagellate cysts observed in land-fast ice are morphologically indistinguishable from the cysts observed in pack-ice. The data demonstrate that the photosynthetic dinoflagellates found in the upper land-fast ice at McMurdo are part of an actively growing assemblage and, in fact, are a characteristic component of the brine during the austral spring.

B-47527

Rivkin, R.B., Anderson, M.R., Gustafson, D.E., Jr., **Dynamics of bacterioplankton growth in McMurdo Sound, Antarctica: evidence for substrate sufficient growth**, *Antarctic Journal of the United States*, 1991 26(5), p.145-146, 12 refs.

The authors previously reported that during the late austral winter and austral spring, bacterial biomass and production can exceed those of the phytoplankton in McMurdo Sound. Here they expand on those initial studies and describe the relationship between phytoplankton and bacterioplankton abundances. They report that bacterial growth does not appear to be limited by the *in situ* substrate concentrations. Water samples were collected from early Sep. through mid-Dec. 1989 and mid-Oct. 1990 through early Jan. 1991 in McMurdo Sound. Chlorophyll *a* was measured fluorometrically. The influence on bacterial growth of enriching seawater with 1 micromolar/l of glucose and amino acids is shown graphically. At the present time, it is unclear which ambient substrates bacterioplankton use for growth. Since bacteria can use complex organic substrates as a carbon source and ammonium as a nitrogen source, the ambient substrate pool would be much larger than simply the sum of amino acids and monosaccharides.

B-47528

Karl, D.M., Tien, G., **Bacterial abundances during the 1989-1990 austral summer phytoplankton bloom in the Gerlache Strait**, *Antarctic Journal of the United States*, 1991 26(5), p.147-149, 16 refs.

In Oct. and Nov. 1989, the authors examined the degree of coupling between autotrophic and microheterotrophic microbial assemblages in northern Gerlache Strait. Surface water samples were collected and analyzed for a variety of chemical and microbiological properties, but this report focuses on the relationships between bacterial biomass as estimated by particulate lipopolysaccharide (P-LPS) concentrations and phytoplankton biomass as estimated by chlorophyll *a* concentrations. Results provide strong support for the hypothesis that microbial loop processes are probably not very important to total southern ocean ecosystem dynamics during the austral summer period of maximum energy flux. These results may be unique to the eutrophic coastal regions of Antarctica where extensive phytoplankton blooms occur.

B-47529

Pearse, V.B., Pearse, J.S., **Year-long settling plate study yields no antarctic placozoans, and surprisingly little else**, *Antarctic Journal of the United States*, 1991 26(5), p.149-150, 5 refs.

The results of a search for placozoans in McMurdo Sound and what community of benthic organisms might be recovered on settling plates in antarctic waters, compared to the rich and diverse assemblages that are routinely observed on such plates in the tropics, are presented. A qualitative listing of the major categories of organisms found in the McMurdo slide sets, compared to those represented on slides set out at a tropical site for a much shorter time, is shown in a table. No placozoans were found.

B-47530

Smith, W.O., Jr., Kelly, H.P., Vogelín, D., Close, A.R., **Phytoplankton sinking rates in the Ross Sea**, *Antarctic Journal of the United States*, 1991 26(5), p.151-152, 4 refs.

As part of a coordinated interdisciplinary study of the production of biogenic material at the surface, its flux and remineralization through the water column, and its accumulation in the sediments, the sinking rates of suspended particulate matter were measured in the Ross Sea in Jan. and Feb. 1990. One of the hypotheses in this program was that the vertical flux of phytoplankton from the ice-edge bloom was large relative to less productive regions. Sinking rates were moderate for the stations sampled, as shown in a table. Sinking rates based on chlorophyll averaged 0.24 and 0.17 m/d at the surface and depth of chlorophyll maximum, respectively. The rates at the chlorophyll maximum tended to be lower than those at the surface, although the means were not statistically different due to the variability in sinking rates between stations.

B-47531

Bird, D.F., Karl, D.M., **Massive prasinophyte bloom in northern Gerlache Strait**, *Antarctic Journal of the United States*, 1991 26(5), p.152-154, 25 refs.

During the RACER program, 69 stations placed regularly over a 25,000 sq km area of southern Drake Passage, Bransfield Strait and northern Gerlache Strait were sampled rapidly (within 5 days) 4 times during the 1986-1987 austral spring and summer. More intensive studies were carried out at selected stations between these monthly regional surveys. The RACER program uncovered striking spatial and seasonal heterogeneity in both biomass and productivity of the plankton within the study area. The January bloom consisted almost entirely of an unicellular quadriflagellate of the genus *Pyramimonas*, subgenus *Trichocystis*. The size of *Pyramimonas* cells varied greatly among stations. In Gerlache Strait, cells ranged from 800 to 13,000 cu microns, averaging about 4,200 cu microns. The discovery of a massive nearly monospecific bloom of *Pyramimonas* in the Antarctic raises the question of how effectively the production of this organism is transferred to higher trophic levels.

B-47532

Vernet, M., Letelier, R., Karl, D.M., **RACER: Phytoplankton growth rates in the northern Gerlache Strait during the spring bloom of 1989**, *Antarctic Journal of the United States*, 1991 26(5), p.154-156, 9 refs.

Massive phytoplankton blooms were observed during the 1989 spring in the southern Bransfield and Gerlache straits. Results obtained in this study were the following: phytoplankton growth rates at the mixed layer were on the average 53 ± 22% of the maximal rates expected (0.58 per day) for the ambient temperature. Maximum growth rates were observed in a nonbloom assemblage, and lowest growth rates were associated with low nitrate concentrations at the surface. Specific growth rates (per day) were nonlinearly related with ambient nitrate concentrations (micromolar). Chlorophyll-to-carbon (weight-to-weight) ratios were positively correlated with

growth, as observed by Laws and Bannister (1980) in nutrient-limited growth of *Thalassiosira fluviatilis* at 20 C.

B-47533

Rivkin, R.B., Anderson, M.R., Gustafson, D.E., Jr., **Ingestion of phytoplankton by polar and temperate echinoderm larvae**, *Antarctic Journal of the United States*, 1991 26(5), p.156-158, 7 refs.

As part of a collaborative study to evaluate the nutritional importance of dissolved and particulate resources, the rates of particulate ingestion are reported for representative field and laboratory experiments with morphologically similar echinoderm larvae from polar (*Odontaster validus*) and temperate (*Asterina miniata*) environments. Natural microbial populations were collected at the ice edge in McMurdo Sound and approximately 2 km offshore of Santa Cruz, CA, in Monterey Bay. The ingestion of radiolabeled prey has been widely used to study the dynamics of grazing by crustacean and protozoan zooplankton; however, it has not been used to measure grazing in echinoderm larvae. The rates of clearance and ingestion of *Dunaliella tertiolecta*, a common food source, by *O. validus* and *A. miniata* were compared. There were no significant differences among replicate bottles within a treatment; however clearance and ingestion rates were significantly ($p < 0.001$) faster in the temperate than in polar larva.

B-47534

Shilling, F.M., Manahan, D.T., **Nutrient transport capacities and metabolic rates scale differently between larvae of an antarctic and a temperate echinoderm**, *Antarctic Journal of the United States*, 1991 26(5), p.158-160, 9 refs.

Early development of an antarctic asteroid (*Odontaster validus*) takes place during austral winter when phytoplankton concentrations in the water column are low. The authors tested the hypothesis that such larvae may have an excess absorptive capacity, relative to metabolic rate, to compensate for low nutrient concentrations. A similar-sized bipinnaria larva of the temperate asteroid *Asterina miniata* was used for comparison. The larvae of *O. validus* were cultured from eggs in 200-l vessels at -1.4 C at McMurdo Station. The larvae of *A. miniata* were cultured from eggs in 20-l vessels at 15 C in California. Mass-specific metabolic rates of the polar larvae were found to be much lower than those of the temperate larvae. In contrast to the large difference between metabolic rates of each species, the differences between mass-specific alanine transport capacities were much smaller. It is concluded that the higher ratio of nutrient acquisition rates to metabolic rates in the polar larva, relative to the temperate larva, will mean that at a given nutrient concentration, the polar species will be able to meet a larger proportion of its metabolic costs.

B-47535

Welborn, J.R., Manahan, D.T., **Seasonal changes in concentrations of amino acids and sugars in seawaters of McMurdo Sound, Antarctica: uptake of amino acids by asteroid larvae**, *Antarctic Journal of the United States*, 1991 26(5), p.160-162, 7 refs.

Having measured the composition and concentration of individual organic chemicals in seawater around McMurdo Sound, the authors then determined how such changes affect the chemistry of invertebrate larvae. Specifically, for bipinnaria larvae of the asteroid *Odontaster validus*, the authors determined which amino acids found in seawater could be transported and how changes in the amino acid concentration of seawater affected both the intracellular free amino acid pools and the rates of protein synthesis. The findings are in agreement with data for temperate echinoderm larvae (Manahan, Davis, and Stephens 1983). It is concluded that the larvae of *O. vali-*

dus have the capacity for net uptake of neutral amino acids from seawater. At concentrations found in surface waters, amino acids do aid in the nutrition of the larvae.

B-47536

Hoegh-Guldberg, O., Welborn, J.R., Manahan, D.T., **Metabolic requirements of antarctic and temperate asteroid larvae**, *Antarctic Journal of the United States*, 1991 26(5), p.163-165, 10 refs.

As part of a broader study focusing on the nutrition of antarctic invertebrate larvae, the metabolic changes of the common antarctic asteroid *Odontaster validus* were compared with those of the temperate asteroid *Asterina miniata*. All larvae were reared in filtered seawater, to which algal food was added. It was found that the metabolic rates of the polar larvae are much lower than those of the temperate larvae. The reduced metabolic requirements measured in this study predict long-term, rather than short-term, survival of asteroid larvae in antarctic seawater.

B-47537

Bowser, S.S., Bernhard, J.M., Alexander, S.P., **Test morphogenesis and bioadhesives in a giant antarctic foraminifer**, *Antarctic Journal of the United States*, 1991 26(5), p.165-167, 3 refs.

An ideal agglutinated foraminiferal species for test morphogenetic and bioadhesive studies, *Astrammmina rara*, is common in the shallow waters of McMurdo Sound. *A. rara*'s test comprises a single layer of large, abutting mineral grains whose exterior interstices are filled with smaller particulates, e.g., sponge spicules and diatom frustules. A comparison of the grain-size distribution of test material and Explorers Cove sediments indicates that *A. rara* incorporates proportionally more coarse grains than present *in situ*, in contrast to other foraminiferal species that incorporate proportionally more fine grains. The architectural benefit (e.g., high tensile strength) of using large grains versus small grains presumably overrides the energetic cost for large-particle collection. Two bioadhesives, distinguishable by their different solubilities in detergents, are present in the tests of *A. rara*. Preliminary enzymatic analyses indicate that the material cementing large grains in *A. rara*'s test is a glycoprotein.

B-47538

Bosch, I., Colwell, S.J., Pearse, J.S., Pearse, V.B., **Nutritional flexibility in yolk-rich planktotrophic larvae of an antarctic echinoderm**, *Antarctic Journal of the United States*, 1991 26(5), p.168-170, 10 refs.

Some antarctic echinoderms (e.g., the sea stars *Porania antarctica* and *Acodontaster hodgsoni*) produce larvae that are nutritional intermediates of obligately planktotrophic and lecithotrophic forms. These unusual planktotrophic larvae are provided with large stores of maternal yolk, a resource that may reduce their dependence on exogenous food. Reported here are representative results of studies on the feeding capabilities, energetics, and growth of yolk-rich planktotrophic larvae of *Porania antarctica* collected at New Harbor, on the western shore of McMurdo Sound, in early Dec. 1989. Observations suggest that in addition to bacteria, algae, and dissolved amino acids, endogenous reserves can make important energetic contributions to the development of *P. antarctica*. This represents an increased nutritional flexibility relative to that of typical echinoderm larvae. In oligotrophic waters of the Antarctic, yolk-rich planktotrophic larvae may gain an advantage by being less dependent on any particular source of food.

B-47539

Pearse, J.S., Bosch, I., Pearse, V.B., Basch, L.V., **Differences in feeding on algae and bacteria by temperate and antarctic sea star larvae**, *Antarctic Journal of the United States*, 1991 26(5), p.170-172, 7 refs.

It is reported that the larvae of the antarctic asteroid *Odontaster validus* can ingest and assimilate both algal and bacterial cells, while the morphologically similar larvae of *Asterina miniata*, an asteroid common along the temperate shores of western North America, can utilize algae but not bacteria. Autoradiographs are shown which revealed activity in the gut cells of bipinnarias of *O. validus* fed bacteria labeled with tritiated thymidine, confirming digestion and assimilation of the ingested bacteria.

B-47540

McClintock, J.B., Slattery, M., Heine, J., Weston, J., **Density, energy content, and chemical activity of three conspicuous antarctic benthic marine invertebrates**, *Antarctic Journal of the United States*, 1991 26(5), p.172-173, 11 refs.

The solitary tunicate *Cnemidocarpa verrucosa*, the alcyonean soft coral *Alcyonium paessleri*, and the large nemertean worm *Parborlasia corrugatus* are common in McMurdo Sound. Their energetic compositions and numerical and energetic densities are presented in a table. Individual and population-level energy contents, lack of conspicuous morphological defenses, and sessile or sluggish nature make these species potentially attractive prey for predatory invertebrates or fish. However, results of experiments suggest that these species are chemically bioactive and may explain why few observations of predation on these species have been observed in the field.

B-47541

Janssen, J., Montgomery, J.C., Montgomery, J., **Under-ice observations of fish behavior at McMurdo Sound**, *Antarctic Journal of the United States*, 1991 26(5), p.174-175, 8 refs.

From an ice observation chamber near Danger Slopes on Ross I. the behavior of nototheniid fish was observed during 1990-1991 austral summer in 1- to 3-hour sessions, morning and afternoon, on 13 dates from Nov. 3-29. Snow was removed to improve light penetration. To help their mapping and to enhance their ability to judge fish sizes, the authors suspended objects of known size through holes drilled. The authors recorded their observations of benthic fish, cryopelagic fish, and the responses to seals on audio tape. Borchs are of particular evolutionary interest because they are descended from benthic species. They apparently have applied aspects of their benthic ancestry to their cryopelagic life.

B-47542

Radtke, R.L., Kellermann, A.K., Ruzicka, J.J., Shepherd, B.S., **Techniques for retrospective analyses of environmental conditions influencing the early life history on antarctic fishes**, *Antarctic Journal of the United States*, 1991 26(5), p.175-177, 6 refs.

The research reported represents a new approach to the evaluation of critical periods in the life histories of antarctic fishes—microstructural otolith analyses, a technique that can document past environmental conditions encountered by individual fishes. It is hoped that these investigations will advance the use of this new approach, as well as the use of elemental composition analyses of otoliths, to determine past environmental and, possibly, food conditions encountered by antarctic fishes. Three otoliths of antarctic icefish were analyzed using the electron microprobe. The strontium-to-calcium concentration ratio profiles of two specimens of *Chionodraco rastrospinosus* (same total lengths) captured at different stations and one specimen of *Chaenodraco wilsoni* captured at yet another station are represented in a figure.

B-47543

Detrich, H.W., III, Parker, S.K., **Domain organization of antarctic fish tubulins: implications for microtubule assembly at low temperature**, *Antarctic Journal of the United States*, 1991 26(5), p.177-178, 11 refs.

The coastal fishes of the Antarctic diverged from temperate fishes approximately 40 m.y.a. as the southern oceans began to cool. Subjected to the selective pressure of an increasingly severe thermal environment, the antarctic fishes evolved over time cellular and molecular adaptations that maintain appropriate biochemical reaction rates and equilibria at their now chronically low body temperatures (-1.9 to +2 C). Recent studies have been focused on the molecular adaptations that enable the microtubules of antarctic fishes to assemble and function efficiently in such an extreme thermal regime. In this report, the authors consider evolutionary constraints imposed by the domain structure of antarctic fish tubulins. To support this research, specimens were obtained of two nototheniids, *N. coriiceps neglecta* and *N. gibberifrons*, and one ice fish, *Chaenocephalus aceratus*. Field studies were conducted at Palmer Station from mid Mar. to late Apr. 1991.

B-47544

Wallace, D.F., McClure, M., Trivelpiece, S.G., Trivelpiece, W.Z., **Continuing studies of the population biology and foraging behavior of Adélie, gentoo, and chinstrap penguins**, *Antarctic Journal of the United States*, 1991 26(5), p.179, 3 refs.

Two continuing investigations during the 1990-1991 season in Admiralty Bay are reported: a demographic study on Adélie, chinstrap, and gentoo penguin populations and the diving and foraging behaviors of the Adélie and gentoo. It was found that for the second consecutive year, both Adélie and chinstrap populations have had large, concurrent declines, indicating poor overwinter survival for both species. Although gentoos fared better than their congeners, it was still a mediocre season. The population declined for the third consecutive year, although not as drastically as the other two species. Like Adélies, this season had the lowest reproductive success ever recorded at this site for gentoos. The fledging rate was well below the previous nadir of 0.9 chicks fledged per pair in 1981-1982. Analysis of the dive patterns and stomach contents continue to yield information about the birds' foraging activities and the development of time budgets for trips to sea.

B-47545

Chappell, M.A., Shoemaker, V.H., Janes, D.N., Maloney, S.K., **Reproductive effort and foraging energetics of Adélie penguins**, *Antarctic Journal of the United States*, 1991 26(5), p.180-181, 4 refs.

During the first field season (Oct. 1990 through Feb. 1991), the authors banded several hundred adult Adélie penguins during the initial courtship phase, and followed the progress of banded pairs throughout the breeding season. These studies provided background data on incubation and foraging schedules, hatch dates, and chick growth rates. Body composition, field metabolic rates, and time-depth recorder studies were performed on well-known individuals at standardized times in the breeding cycle. Data obtained are presented.

B-47572

Duhamel, G., **Careproctus and Paraliparis n.sp., and Edentoliparis, from the southern ocean (Cyclopteridae, Liparinae)** [Descriptions d'espèces nouvelles de *Careproctus* et *Paraliparis* et données nouvelles sur ces genres et le genre *Edentoliparis* de l'océan austral (Cyclopteridae, Liparinae)], *Cybium*, Sep. 30, 1992 16(3), p.183-207, In French with English summary. 28 refs.

Oceanographic cruises in the Weddell Sea (1986 and 1989), Kerguelen Is. (1974 and 1975), Crozet Is. (1976 and 1982), Banzare Coast (1985), and Heard I. and Prydz Bay (1990 and 1991), resulted in the following fish collection of Liparinae (Cyclopteridae): 7 species belonging to the genus *Paraliparis*, one species of *Edentoliparis* and a new species of *Careproctus*, identified in the Indian Ocean; 5 species of *Paraliparis*, including a new species, and 3 species of *Careproctus*, with two new species, found in the Weddell Sea. The descriptions allow one to refine the geographic distribution of the main species, known only from the original description site, and to register the meristic and morphometric characters of most. (Auth. mod.)

B-47574

Obst, B.S., Nagy, K.A., **Field energy expenditures of the Southern Giant-Petrel**, *Condor*, Nov. 1992 94(4), p.801-810, 37 refs.

The doubly labeled water method was used to measure rates of energy expenditure in free-living Southern Giant Petrels (*Macronectes giganteus*, mean body mass=3.89 kg) at Palmer Station. Despite superficial morphological and behavioral resemblances to the energetically efficient albatrosses, giant petrels have high energetic costs while foraging, averaging 6.3 x SMR (standard metabolic rate), which is much higher than the values for three *Diomedea* albatrosses (1.8 to 2.7 x SMR). The integrated field metabolic rate (FMR, incorporating time spent foraging and brooding) of a giant petrel is 4,270 +/- 668 kJ/day, the highest absolute value yet measured in any bird. Their overall FMR is 4.6 x SMR, slightly higher than the suggested upper limit of 4.0 x SMR for breeding birds. Compared with similar-sized albatrosses, Southern Giant Petrels are more heavily wing-loaded, they flap more frequently, and they deliver meals more frequently to their chicks. These factors probably contribute to their higher rates of energy expenditure. Giant petrels breed most abundantly at high latitudes, outside the breeding range of albatrosses. An energy-expensive breeding strategy that incorporates relatively rapid nestling growth and high rates of chick-feeding by adults may account for the success of Southern Giant Petrels in the short growing season of their antarctic habitat. (Auth.)

B-47577

Rodhouse, P.G., White, M.G., Jones, M.R.R., **Trophic relations of the cephalopod *Martialia hyadesi* (Teuthoidea: Ommastrephidae) at the Antarctic Polar Front, Scotia Sea**, *Marine biology*, Nov. 1992 114(3), p.415-421, Refs. p.420-421.

Samples of the squid *Martialia hyadesi* were collected in the north Scotia Sea in Feb. 1989. The dissected stomachs of 61 specimens were classified according to fullness and the contents were examined visually. Identifiable food items included fish sagittal otoliths, crustacean eyes, the lappets on euphausiid first antennule segments and cephalopod sucker rings. The most frequent items in the squid's diet were the myctophid fishes *Krefftichthys anderssoni* and *Electrona carlsbergi*, the euphausiid *Euphausia superba* and a hyperiid amphipod, probably *Themisto gaudichaudi*. The prevalence of copepod-feeding myctophids in the diet of this squid, which is itself a major prey item of some higher predators in the Scotia Sea, suggests that a previously unrecognized food chain, copepod-myctophid-*M. hyadesi*-higher predator, may be an important component of the antarctic oceanic ecosystems. (Auth. mod.)

B-47592

Andreev, M.P., **Lichenological studies during the 34th Soviet Antarctic Expedition** [Likhenologicheskie issledovaniia v Tridtsat' chetvertoï sovetskoi antarkticheskoi ekspeditsii], *Sovetskaia antarkticheskaiia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.44-47, In Russian.

Investigations on lichen flora and growth in littoral East Antarctica, carried out during SAE-34 on board the *Akademik Fedorov* from Jan. 1 1988 to Mar. 29 1989, are described. In the lakes of Bunger Hills, more than 300 samples were collected, and 41 species of lichens (13 endemic to Antarctica), from 22 genera and 9 families, were identified. Factors found to influence lichen occurrence, abundance and grouping in the lake area include humidity, salinity, snow cover, exposure, ground stability or lack of it, and availability of nitrogen.

B-47595

Teshebaev, Sh.B., Troiashkin, A.A., **Bacteriological evaluation of the air in antarctic living quarters** [Bakteriologicheskaiia otsenka vozdukha zhilishch v Antarktide], *Sovetskaia antarkticheskaiia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.55-58, In Russian. 12 refs.

Results of air quality measurements showing the number and type of microorganisms, obtained in 16 areas of at least 9 sq m/man located in different types of buildings—made of wood or aluminum—at Molodezhnaya Station, are presented. It was found that at least four fifths of the total population of microorganisms consisted of coccus flora.

B-47596

Teshebaev, Sh.B., Troiashkin, A.A., **Sanitary evaluation of bacterial contamination of a coastal antarctic station area** [Gigienicheskaiia otsenka bakterial'noi obsemenennosti territorii pribrezhnoi Antarkticheskoi stantsii], *Sovetskaia antarkticheskaiia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.58-63, In Russian. 9 refs.

Summer and winter levels of microbial contamination in samples from various sites of the Molodezhnaya Station area, and soil contamination levels and type of bacteria in the central part of the station, are discussed and shown in figures and a table. At all sites, the abundance of soil bacteria was found to be highest during summer, especially in areas of waste disposal.

B-47602

Kunzmann, A., Zimmermann, C., ***Aethotaxis mitopteryx*, a high-Antarctic fish with benthopelagic mode of life**, *Marine ecology progress series*, Oct. 29, 1992 88(1), p.33-40, Refs. p.39-40.

Aethotaxis mitopteryx DeWitt is one of the lesser known high-antarctic fish species of the family Nototheniidae. Within the last 7 yr close to 90% of all reported specimens were caught in the Weddell Sea and the Lazarev Sea, with only 5% of these in pelagic trawls. Average biomass values of ca 0.69 kg 30/min, which is 10 times the biomass values attained in the Weddell Sea, suggest the Lazarev Sea at depths between 400 and 800 m, or narrow shelf areas of the eastern Antarctic in general, to be a major distribution area of this species. Due to new maximum values reported for length and weight (total length=48 cm, fresh weight=855 g), currently recorded growth parameters have to be adjusted. Adults are characterized by slow growth, high reproductive effort, a benthopelagic mode of life and regular occurrence in the warmer deep water. Due to the high abundance of *A. mitopteryx* larvae in the Weddell Sea, spawning migrations are likely. Structural and functional features of blood as well as observations from aquaria indicate a sluggish mode of life and a limited scope for activity. This and a number of adaptations to life in the pelagial suggest that energy requirements are low. (Auth.)

B-47607

Pichon, J.J., **Quantification of the biogenic silica dissolution in southern ocean sediments**, *Quaternary research*, May 1992 37(3), p.361-378, 26 refs.

A transfer function has been established to quantify the dissolution of diatom silica in southern ocean sediments. The relationship

between the amount of silica dissolution and changes in diatom species distribution is built by controlled progressive dissolution of biogenic silica in five recent sediment samples from box-core tops, each representative of a modern diatom species sediment assemblage. The amount of dissolved silica was measured for each experiment. The resulting data set of species abundances (42 samples containing 32 diatom species and 2 silicoflagellate genera) was added to the modern database of diatom species distributed over the southern ocean (124 core tops). Q-mode factor analysis individualizes four factors explaining 83% of the variance. The first three factors are controlled by surface water properties (mostly temperature). The fourth factor is the only one correlated with loss of silica in the reference samples ($R=0.900$). The correlation process of the dissolution factor is described and explained. Application of the dissolution factor in two cores from the southern ocean (44 and 55S) shows enhanced opal dissolution during the last glaciation, particularly during Emiliani's stage 3 (from 40,000 to 30,000 yr B.P.). (Auth. mod.)

B-47608

Perissinotto, R., McQuaid, C.D., **Deep occurrence of the giant kelp *Macrocystis laevis* in the southern ocean**, *Marine ecology progress series*, Mar.1992 Vol.81, p.89-95, 53 refs.

During a combined hydroacoustic-trawling survey at the Prince Edward Archipelago, a kelp bed of *Macrocystis laevis* growing at a maximum depth of 68 m was repeatedly observed in the open shelf area. This is the deepest population ever described for any species of giant kelp. Nutrient availability and temperature in the area were found to have no significant impact on kelp production and distribution. Likewise, measurements of photon flux density showed that neither plant growth nor sporophyte formation was likely to have been light-inhibited during the period of the observations. However, since irradiance levels in the deep kelp bed were close to the lower threshold for growth, the absence of plants below 68 m depth was probably determined by light availability. Around Marion I., where *M. laevis* is found only within the 20 m isobath, the offshore limit of the kelp beds is controlled by availability of suitable rock substrata. The in-shore limit appears to be set by the maximum height of storm-induced waves.

B-47612

Weissenberger, J., **Environmental conditions in the brine channels of antarctic sea ice** [Die Lebensbedingungen in den Solekanälchen des antarktisches Meereises], *Berichte zur Polarforschung*, 1992 No.111, 159p., In German with English summary. Refs.p.139-149.

Brine channels which are formed in and between ice crystals during sea ice formation are a habitat for a variety of different organism groups. The physical and chemical parameters in the brine channels are governed by freezing processes and other sea ice properties. The aim of this thesis was to determine the physical and chemical *in situ* environment of sea ice. Volume, salinity, pH, chlorophyll *a* determinations as well as enumeration and classification of diatom species were done on brine and melted ice cores. Vertical profiles of all parameters were measured on 34 cores from 17 different ice flows. After removal of ice by sublimation, the shape of the brine channels was photographed using scanning electron microscopy at a resolution ranging from centimeters to a few microns. The three-dimensional array of the brine channels varied according to ice type as well as ice temperature.

B-47613

Hain, S., **Benthic seashells (Gastropoda and Bivalvia) of the Weddell Sea, Antarctica** [Die beschaltten benthischen Mollusken (Gastropoda und Bivalvia) des Weddellmeeres, Antarktis], *Berichte zur Polarforschung*, 1990 No.70, 180p., In German with English summary. Refs. p.102-112.

This study is a monograph-like taxonomical inventory of the benthic seashells (Gastropoda & Bivalvia) of the eastern Weddell Sea, based on the analysis of 75 trawl samples. Living animals of 93 gastropod and 39 bivalve species were obtained in the eastern Weddell Sea. The systematical diversity of the eastern Weddell Sea mollusks is remarkably high. The 93 gastropod species belong to at least 24 families and 48 genera while the 39 bivalve species belong to 16 families and 23 genera. Many categories are monotypic, i.e. represented by one species alone. High species numbers occur only in the families *Buccinidae* (genus *Prosipho*), *Turridae* and *Philobryidae*. Although represented by many species, the biomass of the shelled mollusks in the eastern Weddell Sea is low relative to other benthic invertebrates like sponges, polychaetes or crustaceans, possibly because the populations are small and patchy, the species are very tiny, or they are very fragile. The analyses of the horizontal and vertical distribution patterns of the molluscan species found in the eastern Weddell Sea establish that many gastropods have zoogeographical relationships to high-antarctic seas of East Antarctica (Enderby Land, Davis Sea, Adelie Land), whereas most bivalves have a circum-antarctic distribution which includes the regions of South Shetland Is., South Orkney Is. and Kerguelen. A very widespread eurybathic distribution is a common feature of all studied mollusks. Thirty-six gastropod and 27 bivalve species have bathymetric distribution ranges greater than 500 m. Most bivalves brood their young, whereas most gastropods have a lecithotrophic intracapsular metamorphosis without a free-living larva.

B-47617

Morescalchi, A., Pisano, E., Stanyon, R., Morescalchi, M.A., **Cytotaxonomy of antarctic teleosts of the *Pagothenia/Trematomus* complex (Nototheniidae, Perciformes)**, *Polar biology*, Nov. 1992 12(6-7), p.553-558, 34 refs.

The interspecific relationships and taxonomy of 12 antarctic coastal Nototheniids (the *Pagothenia/Trematomus* complex) are discussed. The authors present karyological data on 8 species. *Pagothenia bernacchii* ($2n=48$) has a generalized karyotype which has not developed heterochromosomes. *P. hansonii*, *P. borchgrevinkii* and *Trematomus newnesi* share very similar karyotypes with $2n=46$ for females and $2n=45$ for males. The difference between sexes is probably due to the development of a multiple sex chromosome system with a neo-Y, typical of males, which originated from a centric fusion of an autosome (now X2) with an undifferentiated Y. The chromosome morphology of the 3 species seems to be related to that of *P. bernacchii*. *T. nicolai* ($2n=58, 57$) has a karyotype numerically and morphologically divergent from that of the above species; *T. nicolai* males may have developed a neo-Y through a tandem translocation. *T. pennellii* ($2n=32$), *T. loennbergii* ($2n=28$; $2n=30$ in a single female) and *T. eulepidotus* ($2n=24$) show karyotypes with progressively fewer chromosomes but with an increasing number of large, bi-armed chromosomes. Such a "symmetrization" process is generally found in advanced poikilothermic vertebrates, and the 3 species of *Trematomus* could therefore be considered as karyologically derived. However, parallelism in the karyotype differentiation producing convergence in the chromosome morphology of distantly related species cannot yet be excluded. (Auth.)

B-47618

Sarà, M., **Biogeographic traits and checklist of antarctic demosponges**, *Polar biology*, Nov. 1992 12(6-7), p.559-585, Refs. p.584-585.

The biogeography of antarctic demosponges has been studied by dividing antarctic and circumantarctic areas into geographic entities, and then assigning to these entities all recorded species according to literature reports. Correspondence analysis ordination based on the presence or absence of species shows the existence of a distinct Antarctic Faunistic Complex (AFC), including continental Antarctica,

most of the antarctic and circumantarctic islands and the Magellan area, resulting in a checklist of 352 antarctic demosponge species. Investigation of within-AFC patterns indicates that the continent is a highly homogeneous area, establishing closer relationships with the Scotia Arc and to a lesser extent with the Magellan region. The AFC has low specific affinities with the other circumantarctic regions (South Africa, temperate Australia and New Zealand), whereas at the generic level relationships appear more pronounced. This biogeographic pattern may lead one to suppose a common Gondwanian origin for antarctic and circumantarctic sponge faunas, followed by differentiation due to Gondwana fragmentation. Antarctica moved towards polar latitudes and became progressively isolated, only maintaining active interchanges with South America. Climatic changes possibly induced intense processes of speciation in the antarctic demosponge fauna, thus contributing to its differentiation. (Auth.)

B-47619

Hawes, I., Howard-Williams, C., Vincent, W.F.,
Desiccation and recovery of antarctic cyanobacterial mats,
Polar biology, Nov. 1992 12(6-7), p.587-594, Refs. p.593-594.

The ability of cyanobacterial mats from antarctic ponds and streams to recover from desiccation is described. Mats dominated by *Nostoc* dehydrated rapidly and were dry within 5 h of exposure. *Nostoc* mats recovered to pre-desiccation rates of photosynthesis and respiration within as little as 10 min of rewetting. Recovery of acetylene reduction activity was slower (> 24 h). *Phormidium* dominated mats were less tolerant of desiccation, and recovery on rewetting from air-drying was not complete after 10 days. Viable diaspores were, however, found in *Phormidium* mats which had been exposed for 3 years. Partial hydration during aerial exposure improved the survival of *Phormidium* mats, but appeared to slow the recovery of *Nostoc* mats on subsequent rewetting. (Auth.)

B-47620

Davey, M.C., Rothery, P., **Factors causing the limitation of growth of terrestrial algae in maritime Antarctica during late summer,** *Polar biology*, Nov. 1992 12(6-7), p.595-601, 27 refs.

The factors causing the cessation of growth and decline of microalgal communities on antarctic fellfield soils during late summer were investigated. Physical and chemical amendments were applied within small enclosures and the size and taxonomic composition of the communities assessed. Most treatments had no effect on the microalgal communities or individual taxa. The addition of calcium nitrate to the soil either singly or as part of a complete growth medium promoted growth of all taxa studied on most sites. As the cation was naturally present in excess in the soil, it is concluded that growth of the microalgal communities during late summer was nitrogen-limited. (Auth.)

B-47621

Karsten, U., Wiencke, C., Kirst, G.O.,
Dimethylsulphonioacetate (DMSP) accumulation in green macroalgae from polar to temperate regions: interactive effects of light versus salinity and light versus temperature, *Polar biology*, Nov. 1992 12(6-7), p.603-607, 27 refs.

The effect of photon fluence rate on the *beta*-dimethylsulphonioacetate (DMSP) content of salt-stressed eulittoral green macroalgae from different geographic regions was determined. At 55 micromol photons/sq m/s, DMSP increased continuously with increasing salinities up to 68 per mill in *Ulothrix implexa*, *U. subflaccida*, *Enteromorpha bulbosa* and *Acrosiphonia arcta* from Antarctica, while the subantarctic/cold-temperate *Ulva rigida* and the temperate *Blidingia minima* showed a large rise in intracellular DMSP concentration

only under gentle hypersaline treatment (51 per mill). At the highest salinity tested, the DMSP content of the latter species declined. In contrast, the capacity to form DMSP in the dark under hypersaline conditions was very low in all species. In addition, the DMSP content of the antarctic species was determined after one year cultivation at 0 C under photon fluence rates of 2, 30 and 55 micromol/sq m/s. All isolates increased their DMSP concentration with increasing irradiance. In contrast to previous experiments done at 10 C, these species exhibited up to 5-fold higher DMSP values at 0 C under most photon fluence rates. The data support the idea of a light-dependent DMSP biosynthesis, and also demonstrate the stimulating effect of low water temperatures on the DMSP content of antarctic green macroalgae. Apparently, in these plants DMSP may function as a cryoprotectant. (Auth.)

B-47622

Kang, S.H., Fryxell, G.A., ***Fragilariopsis cylindrus* (Grunow) Krieger: the most abundant diatom in water column assemblages of antarctic marginal ice-edge zones,** *Polar biology*, Nov. 1992 12(6-7), p.609-627, Refs. p.626-627.

Planktonic diatoms were sampled in the ice-edge zone of the Bellingshausen Sea during the early austral spring of 1990 and of the Weddell Sea during the late spring of 1983, the autumn of 1986, and the winter of 1988. Cells from discrete water samples from 73 stations near the marginal ice-edge zones during all seasons were counted to gain quantitative information on the composition, abundance, and distribution of diatoms. Diatom abundance was dominated by the pennate diatom, usually nanoplanktonic, *Fragilariopsis cylindrus* (Grunow) Krieger. The average integrated abundance of *F. cylindrus* was about 35% of the total diatom abundance. The overall spatial patterns of *F. cylindrus* near the marginal ice-edge zones were similar, with the highest number of cells in open waters rather than ice-covered waters. When all 73 stations were included in the correlation analysis, the abundance of total diatoms was positively correlated with the abundance of *F. cylindrus*, suggesting that the ice-edge pulses of diatom assemblages in the water column largely reflected its abundance. Cluster analysis revealed that the stations in marginal ice-edge zones were not only separated by seasons and locations, but they also separated based on location of stations in relation to the ice edge (open water stations vs. ice-covered stations). (Auth. mod.)

B-47623

Smith, H.G., **Distribution and ecology of the testate rhizopod fauna of the continental antarctic zone,** *Polar biology*, Nov. 1992 12(6-7), p.629-634, Refs. p.633-634.

New records are presented of the occurrence of 7 testate rhizopod species in terrestrial habitats in Queen Maud Land and the Ross Dependency regions of Antarctica: *Arcella arenaria*, *Centropyxis aerophila*, *Corythion dubium*, *Diffugia lucida*, *Diploclamys timida*, *Heleopera petricola*, *Trigonopyxis arcua*. All materials examined showed very low species-richness and very low populations (except *A. arenaria* in *Bryum* moss in southern Victoria Land) compared with records from other parts of the world. Pooling present results with previous records gives a species list to date of 26 for continental Antarctica. These data are interpreted in light of knowledge of species records from peri-antarctic islands, arctic and alpine regions. It is suggested that temperature, moisture (and the frequency and amplitude of fluctuations in these), pH, and biogeographical factors may be significant influences on the distribution and abundance of testate rhizopod species in continental Antarctica. (Auth.)

B-47624

Bengtson, J.L., Stewart, B.S., **Diving and haulout behavior of crabeater seals in the Weddell Sea, Antarctica, during March 1986,** *Polar biology*, Nov. 1992 12(6-7), p.635-644, 44 refs.

Time-depth recorders were used to study the diving and haulout behavior of 6 crabeater seals in the marginal ice edge zone of the Weddell Sea during Mar. 1986. Haulout patterns revealed the seals' clear preference for diving during darkness and hauling out onto sea ice during daylight. Seals did not necessarily haul out every day; individual seals hauled out on 80-100% of days during the study period. Four general dive types were identified: traveling dives, foraging dives, crepuscular foraging dives, and exploratory dives. Nearly continual diving occurred for extended periods (about 16 h) nightly, with one individual diving up to 44 h without interruption. Foraging dives occurring during crepuscular periods were deeper than those made during the darkest hours. The authors suggest that the distinct diel pattern of dive timing and depth may be related to possible predator avoidance behavior by the seals' principal prey, antarctic krill. (Auth.)

B-47625

Convey, P., **Aspects of the biology of the midge, *Eretmoptera murphyi* Schaeffer (Diptera: Chironomidae), introduced to Signy Island, maritime Antarctic, *Polar biology*, Nov. 1992 12(6-7), p.653-657, 27 refs.**

The biology of a population of the subantarctic chironomid midge *Eretmoptera murphyi* Schaeffer, introduced to Signy I. more than 20 years ago, is described. Investment in reproduction by the parthenogenetic adult females is high, with individuals producing single egg batches containing ca. 85 eggs and having a dry weight of more than twice that of the spent female. In culture, egg development rates to hatching are increased significantly by increasing temperature from 2 to 12 °C (a range covering mean summer temperatures found in the species' maritime antarctic habitat, and natural habitat in the subantarctic). The gelatinous matrix of the egg batch forms a skin on drying, which may reduce further water loss, and allow the eggs or pre-emergence larvae to survive the short periods of desiccating conditions likely to occur in their natural habitat. The biology of *E. murphyi* is compared with that of endemic maritime antarctic species *Belgica antarctica*, showing much similarity. *E. murphyi* possesses several preadaptations which allow it to survive the harsher conditions of the maritime Antarctic. (Auth.)

B-47626

Woehler, E.J., Green, K., **Consumption of marine resources by seabirds and seals at Heard Island and the McDonald Islands, *Polar biology*, Nov. 1992 12(6-7), p.659-665, Refs. p.664-665.**

The seabird and seal community at Heard and McDonald Islands comprised an estimated total biomass of 27,893 t of which the 15 breeding species of seabirds made up 70%. The total annual consumption of marine resources was estimated to be approximately 521,000 t, of which 81% was consumed by seabirds. Approximately 165,000 t of fish, 41,600 t of squid and 312,000 t of crustaceans are consumed annually by this seabird and seal community. Breeding populations of King penguins and antarctic fur seals are increasing, while that of the southern Elephant seal is decreasing; there are no data on the population trend for Macaroni penguins, the predominant consumer species. Commercial fisheries are presently operating at the nearby Kerguelen Is. and similar activities may prove to be commercially viable at Heard I. The fishery is for *Champsocephalus gunnari*, a major prey species of penguins and antarctic fur seals at Heard I. during the summer breeding season. (Auth. mod.)

B-47627

Schreiber, A., Svavarsson, J., Storch, V., **Blood proteins in bipolar Priapulida, *Polar biology*, Nov. 1992 12(6-7), p.667-672, 14 refs.**

Molecular weights are provided for 44 blood serum proteins from 4 species of Priapulida: 21 peptides in *Priapulus caudatus* and *P. tuberculatospinosus*, 19 in *Priapulopsis bicaudatus*, and 24 in *P. australis*. One (exceptionally two) proteins predominate in the investi-

gated sera. While electrophoretic patterns are variable within species, phenetic trees constructed on the basis of Czekanowski's distances of peptide pattern resemblance match the taxonomic hierarchy of priapulids. This shows that electrophoretic profiles of denatured serum peptides have a phylogenetic basis, in spite of considerable nongenetic diversity which limits phylogenetic interpretations of the present data set. One may tentatively conclude that molecular differentiation of bipolar priapulids is more extensive than morphological differences, at least in the genus *Priapulus*. (Auth.)

B-47628

Vuorinen, I., Bonsdorff, E., **Effect of the abundance of three predominating copepod species on adequate sample volume and sample size in Bransfield Strait (Antarctic Peninsula) and waters north of the Weddell Sea, *Polar biology*, Nov. 1992 12(6-7), p.679-682, 4 refs.**

Three predominant copepod species, *Metridia gerlachei*, *Calanus propinquus* and *Calanoides acutus*, were studied in Bransfield Strait in the summer of 1988-1989 and in the Weddell Sea in 1989-1990. Copepod abundances were higher in the Weddell Sea, with the exception of *M. gerlachei*, which was evenly distributed over both areas. Local (intra-station) patchiness was not found, indicating random distribution over small areas. In the assessment of inter-station variability in Bransfield Strait, with standard error of the mean set arbitrarily at 20% of the average abundance and a sampling volume of 150 cu m, the theoretical minimum sample size (number of sampling stations) ranged from 6 to 17 for juvenile copepods and from 11 to 25 for adults. The minimum number of stations in the Weddell Sea reached from 5 to 7, and from 7 to 10 respectively. (Auth.)

B-47631

Italy. **Programma Nazionale di Ricerche in Antartide, Antarctic Project: biology. Collection of publications Jan. 1986-July 1991** [Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991], Rome, ENEA, [1991], 402p., Refs. passim. For selected papers see B-47632 through B-47649.

This is a collection of papers dealing with antarctic biology; some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Program and have been published in national and international journals. The aim of the collection is to simplify the access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. A star (*) indicates that the paper is not available at the Antarctic Project Library at present. (Auth.)

B-47632

Dallai, R., Malatesta, E., Focardi, S., **On two antarctic Collembola *Gressittacantha terranova* and *Friesea grisea*, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.23-28, Reprinted from *Revue d'écologie et biologie du sol*, 1988, 25(3), p.365-372. 7 refs.**

During the 3rd Italian Antarctic Expedition, carried out between Dec. 1987 and Feb. 1988, two Collembolan species were found in samples of biological material collected in the Terra Nova Bay area: *Friesea grisea*, and *Gressittacantha terranova*. The latter, known only at Terra Nova Bay, is redescribed; the genus is characterized by the presence of 6 + 6 spine-like setae on the last abdominal segments and a shortened furcula.

B-47633

Di Prisco, G., **Antarctic fish and adaptation to low temperatures** [Pesci antartici e adattamento alle basse temperature], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.57-63, In Italian with English summary. Reprinted from *Acqua-Aria*, 1988, 4, p.445-451. 31 refs.

Cold adaptation in antarctic fishes developed in the course of millions of years; the presence of "antifreeze" glycoproteins, which prevent the formation of ice crystals in body fluids, permits the survival of these organisms, which at the virtually constant environmental temperature of -1.8 C would freeze to death if unable to carry out their biosynthesis. A marked decrease in both the number of erythrocytes and hemoglobin concentration has been observed in the blood of the 4 major families of antarctic fishes; the resulting decrease of the blood viscosity is an aspect of cold adaptation. The hemoglobins from 13 fish species have been isolated; oxygen binding studies have been carried out for some of these. Determination of structural features and amino acid sequence of globin chains is under way. (Auth.)

B-47634

Battaglia, B., Goffart, A., Hempel, I., Siegel, V., **Zooplankton distribution, biochemistry and genetics**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.76-80, Reprinted from *Berichte zur Polarforschung*, 1989, 62, p.143-147.

On both transects into the pack-ice zone of the inner Weddell Sea in 1988-1989, zooplankton abundance was poor even compared with the findings in the southeastern Weddell Sea at the same time of the year two years ago. The paucity of zooplankton was mainly related to biomass, less to diversity. Larval or juvenile stages of molluscs, echinoderms, ctenophores and polychaetes were regularly found. Most of them looked more transparent than in summer. Also pteropods, different species of ostracods and chaetognaths were met on all Bongo stations. Unusually rare were the typical antarctic copepods *Calanus propinquus* and *Calanoides acutus* as well as *Metridia gerlachei*, which had been relatively abundant in the southern Weddell Sea at this time of year. Samples mainly from the RMT catches (very few from Bongo Net) of the following species have been collected and preserved for specialized laboratory studies: *Euphausia superba*, *E. crystallorophias*, *Thysanoessa* sp. *Clio pyramidata*, *Notolepis* sp. *Cyllopus lucasii*, *Cyllopus magellanicus* and *Eusirus* sp.

B-47635

Bianchi, F., **Brine investigations**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.81-83, Reprinted from *Berichte zur Polarforschung*, 1989, 62, p.95-97.

Brine was collected from various different ice floes to determine the composition of the different assemblages; to obtain estimates of organism numbers and biomass; to study the chemical composition of the brine; and to investigate the activity of sea ice organisms, i.e. C-14 uptake, nitrogen regeneration and O₂ production. Results indicate that biological activity within the ice is already very high long before the ice melts or breaks up. This activity is even more enhanced when the assemblages mentioned in this report are exposed to

the surrounding sea water or when infiltration of sea water occurs more freely. In this way the sea ice becomes the most important substratum for primary production during the antarctic winter and spring.

B-47636

Bianchi, F., **Phytoplankton communities**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.84-91, Reprinted from *Berichte zur Polarforschung*, 1989, 62, p.117-124.

The objectives of this study were: to follow the spring development of phytoplankton on a spatial scale; to relate the biological and chemical properties (biomass and species composition as well as oxygen and nutrient concentrations to hydrographic properties of the water column); and to determine the effects of sea ice cover and ice melting on the phytoplankton. The ice observations of the area of investigation can be divided into three zones: the open water zone reaching from 58S to approximately 60S, the ice edge zone with increasing ice cover to the south up to 62 deg 30'S, and the pack ice zone. Some of the findings are discussed.

B-47637

Camardella, L., **Primary structure and functional features of hemoglobins from several species of antarctic teleosts**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.93-97, Reprinted from proceedings of the conference *Proteine '89*, 4th, Siena, Sep. 14-16, 1989, p.65-68. 12 refs.

Data have been collected on 24 species of the families Nototheniidae (14 sp.), Bathydraconidae (3 sp.), Harpagiferidae (1 sp.), Artedidraconidae (2 sp.), Rajidae (1 sp.) and Zoarcidae (3 sp.). With the exception of Zoarcidae, which have 4-5 major hemoglobins, the hemolysates contain a single component, accompanied in most Nototheniids and in one Bathydraconid by a second, more anodal one (Hb 2, 5-10% of total) and by traces of one with very low electrophoretic mobility. In one species (*Trematomus newnesi*), however, the latter component was present in substantial amounts (20-25%). The hemoglobins from 16 species were purified and obtained in crystalline form from 10 of these.

B-47638

Camardella, L., D'Avino, R., Romano, M., Di Prisco, G., **Primary structure and functional properties of Hb 1 of the antarctic nototheniid *Trematomus newnesi***, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.98-99, Reprinted from proceedings of the conference *Proteine '89*, 4th, Siena, Sep. 14-16, 1989, p.162-163. 5 refs.

Trematomus newnesi (family Nototheniidae) has a major and a minor hemoglobin (Hb 1 and Hb 2, approximately 70% and 5% of the total, respectively). In addition, a component with very low electrophoretic mobility is present in substantial amounts (Hb C, 25%; only traces of this component are found in other species). These hemoglobins are functionally distinct: the Root effect (a sharp decrease of oxygen affinity at acidic pH) is shown only by Hb C; Hb 1 and Hb 2 display this effect to some extent only at very low pH, well below the normal physiological range.

B-47639

Camardella, L., **Life under extreme conditions: biochemistry of cold adaptation in antarctic fishes**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.101-104, Reprinted from CHIMICAoggi, May 1989, 7, p.68-68. 18 refs.

Data have been collected on 24 species from 5 antarctic families (Nototheniidae, Bathydraconidae, Harpagiferidae, Zoarcidae and Rajidae) during the course of 8 field seasons in two widely separated regions: at Palmer Station, and at Terra Nova Bay. The hemolysates have been examined by electrophoresis on cellulose acetate at pH 9.0. A qualitatively similar pattern was observed in the hemolysates of all Nototheniidae, indicating the presence of a major component (Hb 1, 85-90% of total) and often of a second, more anodal one (Hb 2, 5-10%). A single hemoglobin was observed in all other cases, with the exception of the Zoarcid (4 components). In conclusion, the modification of the hematological characteristics of antarctic fishes may be considered a form of specialization, for optimal adjustment of the physiology of oxygen transport and circulatory function to the climatic conditions of the environment.

B-47640

D'Avino, R., **Hemoglobins in cold-adapted antarctic teleosts**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.109-111, Reprinted from Italian journal of biochemistry, Jan.-Feb. 1989, 38(1), p.33A-35A. 12 refs.

The study on the relationship between molecular structure and biological function in hemoglobins of red-blooded antarctic species (about 80) in the more general framework of attempting to elucidate the physiological and biochemical basis of cold adaptation, has led the authors to collect data on 24 species of 5 major antarctic families. Hemoglobins from more than half of these species have been purified and characterized with regard to number and type of subunits, molecular weight, amino acid composition, and crystallization; a study of amino acid sequences has also been undertaken. All hemolysates have been examined by electrophoresis on cellulose acetate at pH 9.0. In Nototheniidae, one major component (80-95% of total) was detected, often together with a second, more anodal one (5-15%). A single component was observed in Bathydraconidae (with one exception, in which an additional minor one was also detected), Harpagiferidae and Rajidae.

B-47641

D'Avino, R., Di Prisco, G., **Hemoglobin from the antarctic fish *Notothenia coriiceps neglecta*. 1. Purification and characterisation**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.113-119, Reprinted from European journal of biochemistry, 1989, 179, p.699-705. 44 refs.

The erythrocytes of the antarctic benthic teleost *Notothenia coriiceps neglecta* have been shown to contain two hemoglobins, accounting for about 90% and 5% of the total content. These hemoglobins have been isolated, and obtained in crystalline form. They are tetramers and contain two pairs of globin chains. The globin chains of each hemoglobin have been purified and characterized.

The two hemoglobins appear to have one of the two globin chains in common. The Root and Bohr effects have been investigated in erythrocytes, "stripped" hemolysates and pure hemoglobins, indicating that the functional properties are finely regulated by pH and allosteric effectors. (Auth. mod.)

B-47642

D'Avino, R., **Hemoglobin from the antarctic fish *Notothenia coriiceps neglecta*. 2. Amino acid sequence of the alpha chain of Hb 1**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.121-127, Reprinted from European journal of biochemistry, 1989, 179, p.707-713. 25 refs.

The complete amino acid sequence of the alpha chain of the main hemoglobin of the antarctic fish *Notothenia coriiceps neglecta* has been determined. It consists of 142 residues; an acetylated seryl residue is at the amino terminal. The molecular mass is 15519 Da. In comparison with alpha-chain sequences of non-antarctic poikilothermic fish hemoglobins, the homology appears to be significantly lower than that existing among the latter species. A higher homology has been found with the alpha-chain sequence of the non-poikilothermic bluefin tuna. (Auth.)

B-47643

D'Avino, R., **Amino acid sequence of the alpha- and beta-chains of the two hemoglobins of the antarctic fish *Notothenia coriiceps neglecta***, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.132-135, Reprinted from FEBS letters, June 1989, 250(1), p.53-56. 30 refs.

The blood of the antarctic fish *Notothenia coriiceps neglecta* contains two hemoglobins, Hb 1 and Hb 2, which have a beta-chain in common. The authors have elucidated the primary structure of the beta-chain (146 residues) and of the alpha-chains (142 residues) of the two hemoglobins. The two alpha-chains differ from each other by 51 residues; in comparison with globin sequences of temperate fishes, the alpha-chain of Hb 1 is more similar to that of bluefin tuna than to the alpha-chain of Hb 2 of the same species. (Auth.)

B-47644

Mercantini, R., Marsella, R., Cervellati, M.C., **Keratinophilic fungi isolated from antarctic soil**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.167-172, Reprinted from Mycopathologia, 1989, 106, p.47-52. 8 refs.

In the present study, 10 soil samples were collected aseptically from an equal number of areas, during the 1986-1987 Italian Antarctic Expedition, for research on keratinophilic fungi. Of particular interest was the isolation of a pathogenic fungus, *Microsporum gypseum*, from two sites at Terra Nova Bay Station. *Trichophyton terrestre* was isolated from a site at which people worked and through which penguins and skuas passed. The most widespread fungal species were members of the genus *Chrysosporium*. Some of these species were isolated but not identified. Another significant finding was the absence of fungi in one sample, while in another a widespread and abundant growth in all the seeded dishes of a single species of *Chrysosporium* was seen. Other species in genera of general diffusion in

many environments were also isolated: *Aspergillus* spp., *Malbranchea* sp., *Mycelia sterilia* spp., *Paecilomyces* sp., *Penicillium* spp. and *Scopulariopsis* spp. (Auth.)

B-47645

Acierno, R., Agnisola, C., **New chamber for the isolated fish heart perfusion that simulates intrapericardial suction: application to the icefish**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.176-177, Reprinted from proceedings of the International Conference on the Biology of Antarctic Fishes, 2nd, Ravello May 30-June 1, 1990, p.49-50. 3 refs.

Isolated fish heart preparations without pericardium cannot behave like the *in vivo* fish which performs under physiological input pressure and at corresponding myocardial stretches. Because the parietal pericardium is firmly connected to the perimysium of the muscles surrounding the heart, it is very difficult to obtain an *in vitro* icefish heart preparation with an intact pericardium. To solve this problem, a perfusion chamber for the isolated fish heart preparation has been set up, which allows the development of subambient pressures during ventricle contractions. This type of perfusion chamber seems to be well suited to allow an atrial filling with a suctional mechanism similar to the *vis a fronte* mechanism operating in the intact fish, allowing the heart to work at physiological levels with subambient preloads.

B-47646

Camardella, L., **Antarctic fish haemoglobin: X-ray analysis of the major component from the species *Trematomus newnesi***, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.182-183, Reprinted from proceedings of the conference Proteine '90, 5th, Urbino May 24-26, 1990, p.285-286. 5 refs.

Trematomus newnesi so far is the only species endemic to Antarctica possessing a second major haemoglobin (Hb C, 20-25% of total), in addition to Hb 1 and Hb 2. Following purification, the carbon-monoxide derivative of Hb 1 has been crystallized from ammonium sulphate. The current crystallographic R factor is 0.24, based on 15765 reflections and the non-hydrogen atoms of the protein. The electron density map is sufficiently well defined, except for a few segments which include the carboxyl end of the two chains and the CD corner of the alpha chain. On the whole the alpha chain appears to be better defined than the beta chain, and its average thermal factor is significantly lower.

B-47647

Valbonesi, A., Luporini, P., **New marine species of *Euplotes* (Ciliophora, Hypotrichida) from Antarctica**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.307-311, Reprinted from British Museum (Natural History). Bulletin, Zoology, May 31, 1990, 56(1), p.57-61. 28 refs.

A new *Euplotes* morphospecies was isolated from marine sand sediments of Terra Nova Bay and grown in the laboratory. It belongs to the group of *Euplotes* species which are characterized by a dorsal silver-line system of the "double" type and a set of 10 frontoventral

cirri. A distinctive trait of the new species is a marked polymorphism, which develops in association with a food stimulus. The number of the dorsolateral kinetics was found to be normally 10. However, most of the other diagnostic morphological traits showed conspicuous variations. (Auth. mod.)

B-47648

Valbonesi, A., Luporini, P., **New species of *Uronychia* (Ciliophora, Hypotrichida) from Antarctica: *Uronychia antarctica***, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.321-324, Reprinted from Boll. zool., 1990, 57, p.365-367. 19 refs.

A new species of *Uronychia*, *U. antarctica*, was collected from marine sand sediments of Terra Nova Bay and studied by means of scanning electron microscopical observations. It is a medium-sized ciliate (54 x 45 microns) characterized by an anterior set of nine adoral ciliary membranelles, and a mid-dorsal kinety (or kinety No.4) which terminates at the level of the cell equator and contains up to 23 bristle cilia. (Auth.)

B-47649

Linskens, H.F., Bargagli, R., Focardi, S., Cresti, M., **Antarctic moss turf as pollen traps**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore biologia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: biology. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.389-397, Reprinted from Koninkl. Ned. Akad. Wetenschap., Proceedings, June 17, 1991, 94(2), p.233-241. 23 refs.

Moss samples collected during the antarctic summer in Jan. 1990 in Victoria Land, which is over 2,000 km from the nearest land mass with angiosperm plants, contained various pollen species. Seven tree pollen species and at least six non-tree species were found in the samples; grass pollen was observed several times. *Lycopodium* spores were trapped in two samples. These observations provide additional confirmation of the long-distance transport of diaspores in general and of pollen grains from anemophilous plants in particular. Moss turf and cushions can be used in remote areas as pollen traps. (Auth.)

B-47658

Surova, T.G., Vtiurin, B.I., Troitskiĭ, L.S., **Pollen and spores from glaciers and from the proglacial zone in the Arctic and Antarctica**, *Polar geography and geology*, Apr.-June 1992 16(2), p.167-173, 9 refs. For Russian original see 47-340 or 20B-46994.

The results of spore/pollen analysis of surface samples collected from glaciers and from proglacial zones in the Arctic (Spitsbergen) and Antarctica are presented. Surface samples collected in Antarctica contain mainly pollen and spores transported from New Zealand and South America. An anthropogenic origin, however, is also possible. It is obvious that spore/pollen analysis of sediment samples in the high latitudes helps to cast light on the patterns of atmospheric circulation both at present and in the recent past. (Auth. mod.)

B-47702

Stiboy-Risch, C., **New species of Ammonotheidae from Antarctica** [*Ammonothea bicorniculata*, eine neue Art der Ammonotheidae aus der Antarktis (Pantopoda, Pycnogonida)], *Bonner zoologische Beiträge*, July 1992 43(2), p.333-338, In German with English summary. 3 refs.

Ammothea bicorniculata, a new species of Ammotheidae from Antarctica, is described and illustrated. Two specimens were sampled by dredge near Elephant I. and Princess Martha Coast during RV *Polarstern* cruises in 1984/85. The depth range of *A. bicorniculata* was 220 m to 473 m. It is discussed whether analogous development of well-functioning Cheliphores in *A. bicorniculata*, *A. striata*, *A. profunda* and *A. gigantea* indicates a close relationship among these species. (Auth.)

B-47703

Helbling, E.W., Villafañe, V., Ferrario, M., Holm-Hansen, O., **Impact of natural ultraviolet radiation on rates of photosynthesis and on specific marine phytoplankton species**, *Marine ecology progress series*, Feb. 18, 1992 80(1), p.89-100, 36 refs.

Natural phytoplankton populations from both antarctic and tropical waters were exposed to solar radiation to determine the effects of ultraviolet radiation (UVR) on rates of photosynthesis. Radiation in the UV-A region (320 to 400 nm) was responsible for over 50% of the total inhibition due to UVR, with less than 50% due to UV-B (280 to 320 nm). Wavelengths <305 nm, which is the spectral region most enhanced under conditions of low ozone concentrations in the atmosphere, accounted for only 15 to 20% of the total inhibition due to UV-B radiation. Under high-light conditions on sunny days, photosynthetic rates were increased 200 to 300% by screening off all UVR below 378 nm. When the average UVR (295 to 385 nm) during the incubation period was below a threshold value of 5 to 10 W/sq m, there was no significant depression of photosynthetic rates. Microscopic examinations of a phytoplankton population which was allowed to grow for 5 d under high solar irradiance indicated that UVR is more inhibitory to microplankton than to nanoplankton, and that it induced the formation of resting spores in diatom species of the genus *Chaetoceros*. Phytoplankton from tropical waters showed marked resistance to UVR as compared to antarctic phytoplankton. (Auth. mod.)

B-47704

Vishniac, H.S., Kurtzman, C.P., ***Cryptococcus antarcticus* sp. nov. and *Cryptococcus albidosimilis* sp. nov., basidioblastomycetes from antarctic soils**, *International journal of systematic bacteriology*, Oct. 1992 42(4), p.547-553, 33 refs.

Cryptococcus albidus, which was described as having maximum growth temperatures (T_{max}) that vary from <20 to >37 C, is an apparent exception to van Uden's rule that yeast species generally comprise strains which have T_{max} that vary by not more than 5 C. This exception is dealt with in this paper by the description of phenotypically similar species that have lower T_{max} than *C. albidus* and exhibit no significant DNA similarity to the type strain of *C. albidus*. *Cryptococcus albidosimilis* sp. nov., a mesophilic blastobasidiomycete that was isolated from soil of Linnaeus Terrace, has a T_{max} of 30 C and a guanine-plus-cytosine content of 55 mol%. *Cryptococcus antarcticus* sp. nov. is a psychrophilic blastobasidiomycete known only from soils of University Valley. *C. antarcticus* does not exhibit significant DNA similarity with *C. albidosimilis* from which it differs phenotypically in its failure to assimilate lactose. The guanine-plus-cytosine content of *C. antarcticus* is 55 mol%. This species includes four biotypes whose levels of DNA similarity are greater than 72%. The T_{max} of these biotypes varies from 15 to 25 C. Both habitat temperature and the sporadic availability of liquid water in University Valley apparently were factors in the evolution of this species. (Auth. mod.)

B-47708

Guinet, C., **Growth of elephant seals during their first year of life** [Croissance des éléphants de mer de l'archipel Crozet (46deg25'S, 51deg45'E) pendant leur première année de vie], *Mammalia*, 1992 56(3), p.459-468, In French with English summary. 32 refs.

Growth of *Mirounga leonina* has been studied between birth and first year moult on Crozet Archipelago. During the 3 week lactation period weight increased from 38.5 kg at birth to 128.4 kg at weaning. The heaviest at birth grow the fastest. During the fasting period, the weight loss is positively correlated with the weaning weight. Average weight of elephant seals back for their first year moult was 184.5 kg. Assuming that the growth rate remains at the same level, sexual maturity of females could be reached at 2 years, which is confirmed by tag controls. Elephant seal growth does not appear to be depressed on the Crozet Archipelago, suggesting that factors other than food depletion probably explain the sharp decrease in size of the elephant seal population there. (Auth.)

B-47713

Kennicutt, M.C., II, McDonald, T.J., Denoux, G.J., McDonald, S.J., **Hydrocarbon contamination on the Antarctic Peninsula. II. Arthur Harbor inter- and subtidal limpets (*Nacella concinna*)**, *Marine pollution bulletin*, Oct. 1992 24(10), p.506-511, 6 refs.

Accidental and operational releases of hydrocarbons during activities in support of scientific bases in the Antarctic can contaminate organisms in close proximity to these locations. Intertidal and subtidal limpets in Arthur Harbor were found to contain elevated levels of polynuclear aromatic hydrocarbons near Palmer and Old Palmer Stations. Contamination was highest in the intertidal and decreased with increasing water depth in the subtidal. The highest concentrations of tissue contamination were found in intertidal areas associated with high levels of onshore soil contamination. Limpets (*Nacella concinna*) preferentially incorporated the more water soluble aromatic compounds, suggesting exposure to dissolved contaminants in run-off rather than particulates or slicks. This was in contrast to subtidal sediments that were primarily contaminated with freshly spilled diesel fuel. While contamination was present near stations, the concentrations observed are 1-2 orders of magnitude lower than the initial contamination caused by the *Bahia Paraíso* diesel fuel spill in 1989.

B-47716

Gleitz, M., Thomas, D.N., **Physiological responses of a small antarctic diatom (*Chaetoceros* sp.) to simulated environmental constraints associated with sea-ice formation**, *Marine ecology progress series*, Nov. 1992 88(2/3), p.271-278, 38 refs.

The physiological responses of a small unicellular *Chaetoceros* species, isolated from the Weddell Sea, to changes in temperature, salinity and irradiance simulating those that occur during new-ice formation were investigated. The combination of increased salinity, increased quantum irradiance and decreased temperature significantly reduced growth and photosynthetic rates compared to the control, although cellular metabolism was not inhibited. The cells retained the capacity to photoacclimate, which was observed in the variations in cellular chlorophyll *a* concentrations and carbon allocation patterns. In terms of photosynthesis, a doubling of quantum irradiance apparently compensated for the adverse effects of increased salinity and lowered temperature. It is thus hypothesized that at least some species of the late season phytoplankton population survive incorporation into ice and continue to photosynthesize and grow under the extreme conditions encountered during sea-ice formation. This potentially prolongs the antarctic vegetation period well into late austral autumn and winter, enhancing the total primary production available for higher trophic levels. (Auth.)

B-47717

Davaine, P., Beall, E., **Relationships between temperature, population density, and growth in a seatrout population (*S. Trutta* L.) of the Kerguelen Islands**, *ICES journal of marine science*, Nov. 1992 49(2), p.445-451, 13 refs.

Brown trout were introduced into the Kerguelen Is. (subantarctica) in 1958. Since then, acclimatized populations have colonized adjoining rivers and have undergone a differentiation into migratory and sedentary forms in either lakes or the sea. In the Kerguelen rivers, free of indigenous fish and characterized by an elementary structure, relationships between environmental factors and trout population parameters are more direct and thus easier to demonstrate. The sea trout population of the Baie Norvegienne (SW Kerguelen) has been sampled for 18 years. Annual growth increments in the river and in the sea were backcalculated and validated. Population densities were determined by electrofishing inventories in test areas representative of the different biotas. Mean annual air temperatures were obtained from the recordings of the meteorological station at Port-aux-Français, close to the study area. Examination of correlations with growth showed a highly significant effect of temperature for the age groups: first year in the river and first and second year at sea, which were not subjected to strong spatial competition. No effect of temperature was observed among second and third year age groups in the river for which favorable areas and feeding resources were less abundant, due to a highly significant increase in population density. (Auth.)

B-47720

Buser, H.R., Müller, M.D., Rappe, C., **Enantioselective determination of chlordane components using chiral high-resolution gas chromatography-mass spectrometry with application to environmental samples**, *Environmental science and technology*, Aug. 1992 26(8), p.1533-1540, 33 refs.

The enantiomer separation of several chiral octachlordanes including *cis*- and *trans*-chlordane was achieved and enantiomeric ratios of approximately 1:1 were determined using a modified *beta*-cyclodextrin as the chiral selector. The method was then applied to tissue extracts of several aquatic vertebrate species collected from the Baltic Sea (herring, salmon, and seal) and from Antarctica (penguin). The isomer profiles of the octa- and nonachlordanes observed in the biological samples using achiral HRGC-MS differed from those observed in a technical chlordane mixture, with some minor components of the technical mixture showing much higher abundance in the aquatic samples. Chiral HRGC now showed enantiomeric ratios of several chiral octachlordanes differing from 1:1 in each of these aquatic species. The changed enantiomeric compositions likely result from enantioselective biological processes and not from abiotic processes such as chemical, distribution, or transport processes in the environment. The results reinforce previous data showing the presence of these contaminants in biota from the most remote area on earth, Antarctica. (Auth.)

B-47745

Nicol, S., De la Mare, W., **Ecosystem management and the antarctic krill**, *American scientist*, Jan.-Feb. 1993 81(1), p.36-47, 9 refs.

Antarctic krill, whose dense surface swarms often turn the waters around Antarctica a deep reddish-brown, are the food source for most of the carnivores of the southern ocean. The abundant crustaceans are easy to harvest, although they require much processing to make food suitable for human consumption. The rapid development of the krill fishery in the 1970s, combined with concern about the conservation of sea birds, whales, and seals that feed on krill, prompted the drafting of an international convention that takes an unusual whole-

ecosystem approach to fisheries management. The first limits on krill fishing have now been adopted for areas in the South Atlantic and the South Indian Oceans.

B-47747

Duchamp, C., **Nonshivering thermogenesis in king penguin chicks. I. Role of skeletal muscle**, *American journal of physiology*, Dec. 1991 261(6), p.R1438-R1445, 33 refs.

In cold-acclimatized (CA) king penguin chicks exhibiting nonshivering thermogenesis (NST), protein content and cytochrome oxidase (CO) activity of tissue homogenates were measured together with protein content, CO, and respiration rates of isolated mitochondria from skeletal muscle and liver. The comparison was made with chicks reared at thermoneutrality (TN) for at least 3 wk. In CA chicks showing a NST despite the lack of brown adipose tissue, an increase in thermogenic capacity was observed in skeletal muscle in which the oxidative capacity rose, whereas no change occurred in the liver. Oxidative capacity of skeletal muscle increased together with the development of mitochondrial inner membrane plus cristae in muscles of CA chicks, contrary to their TN littermates. Subsarcolemmal mitochondria of CA chicks had a higher protein content and higher oxidative capacities than in controls. The lower respiratory control ratio of these mitochondria might result from a low ADP phosphorylation rate. No change occurred in the intermyofibrillar fraction nor in liver mitochondria. These findings, together with earlier results obtained in cold-acclimated ducklings, indicate the marked and suited adaptation of skeletal muscle and in particular of subsarcolemmal mitochondria, allowing them to play a role in NST. (Auth. mod.)

B-47748

Duchamp, C., **Nonshivering thermogenesis in king penguin chicks. II. Effect of fasting**, *American journal of physiology*, Dec. 1991 261(6), p.R1446-R1454, 34 refs.

The effect of fasting on the energy metabolism of skeletal muscle and liver was investigated in cold-acclimatized short-term fasting (STF) (3 wk) and naturally long-term fasting (LTF) (4-5 mo) king penguin chicks, both groups exhibiting nonshivering thermogenesis (NST). A comparison was made with nourished cold-acclimatized controls. In these chicks, no brown adipose tissue deposits could be found in electronmicroscopic observations of fat deposits. Protein content and cytochrome oxidase (CO) activity of tissue homogenates were measured in liver and pectoralis and gastrocnemius muscles, as were protein content, CO activity, and respiration rates of mitochondria isolated from these organs. Fasting-induced protein loss affected the pectoralis more than the gastrocnemius muscle, thus preserving locomotor function. In STF chicks, specific mitochondrial protein content and specific tissue CO activity were preserved, but total organ CO capacity was reduced by half in pectoralis and liver following the fall in organ mass. Compared with the findings in nourished cold-acclimatized chicks, the present results indicate that, despite the fast, skeletal muscle in STF and the liver in LTF cold-acclimatized chicks conserve a large part of their adaptive capacity to play a role in NST. This aptitude is consistent with the natural way of life of king penguin chicks at this stage of development. (Auth. mod.)

B-47750

Grunbaum, D., **Local processes and global patterns: biomathematical models of bryozoan feeding currents and density-dependent aggregations in antarctic krill**, Ithaca, Cornell University, 1992, 223p., University Microfilms order No. 92-11362, Ph.D. thesis. Refs. passim.

This dissertation is a presentation of studies of two biological systems in which global patterns arise as the collective outcome of dynamical interactions between individual modules. The first study is a numerical model of the hydrodynamic interactions between zo-

oids of an encrusting bryozoan, *Membranipora membranacea*. The model results suggest that these interactions may underlie both the function and the organizational scheme of coordinated feeding structures (excurrent chimneys), and account for the cost of induced defensive spines. Experimental results which support these hypotheses are described. The second study is an analysis of the impact of schooling and swarming behaviors on biomass distributions in antarctic krill, *Euphausia superba*. A continuum (partial integro-differential equation) model of group swarm dynamics is derived from a stochastic model of swarming individuals. The stochastic swarming model employs individuals with a finite sensing distance and a species-specific target number of neighbors. The continuum model accurately approximates the group dynamics of the stochastic model if individual locations can be described as Poisson points. The effect of social behavior on the density distributions and power spectra of a species in a forced advection environment is examined. The results suggest that social behavior in antarctic krill may account for the unexpectedly high variance observed in krill biomass at short length scales. (Auth. mod.)

B-47777

Delille, D., Mallard, L., **Seasonal changes of antarctic marine bacterioplankton**, *Kieler Meeresforschungen, Sonderheft*, 1991 No.8, European Marine Microbiology Symposium, 4th, Kiel, Germany, Oct.8-12, 1990. Proceedings, edited by G. Rheinheimer et al, p.213-218, 24 refs.

DLC QH91.A1 K53 No.8, 1991

During a one-year period the development of antarctic coastal seawater bacterioplankton was followed. Two field stations (surface and deep water=20 m) were sampled daily in 1989 in the Terre Adélie area. The survey included physicochemical (temperature and particulate organic matter) and bacteriological (total and heterotrophic bacteria, bacterial production) measurements. Whereas bacterial parameters at the deep water station remained fairly constant, bacterial parameters in surface waters generally increased during the year, obviously in relation to the formation of sea ice. (Auth.)

B-47784

Gillet, P., **Biogeography and polychaete assemblages from subantarctic islands (Indian ocean): Marion Dufresne MD/08 benthos expedition to Marion, Prince Edward and Crozet Islands**, *Bulletin of marine science*, Mar. 1991 48(2), p.358-368, 22 refs.

During the MD/08 Benthos Expedition (from Mar. 7-Apr 26, 1976) about 7,000 polychaetous annelids were collected from 70 stations from Marion, Prince Edward and Crozet Is. A cluster analysis was used to define benthic polychaete taxocoenoses with a matrix data of 77 species and 55 samples. Six polychaete assemblages were found in which two were original: an assemblage occurring in shallow water and black sand with *Pseudonereis anomala*, *Leitoscoloplos fragilis* and *Travisia kerguelensis* and a second group in deeper water and hard bottom with *Polyeunoa laevis* the dominant species. These polychaete assemblages occurred on the continental shelves of Marion, Prince Edward and Crozet Is., and are discussed in relation to their biogeography and compared with the fauna of South Africa and the Kerguelen Is. (Auth.)

B-47841

Jacob, A., Wiencke, C., Lehmann, H., Kirst, G.O., **Physiology and ultrastructure of desiccation in the green alga *Prasiola crispa* from Antarctica**, *Botanica marina*, 1992 35(4), p.297-303, 30 refs.

Physiological and fine structural responses of the antarctic green alga *Prasiola crispa* spp. *antarctica* (Kütz.) Knebel to desiccation and reimmersion in seawater are described. Experiments were conducted in the dark over a 14 day period, using a range of relative humidities

(5% to 95%). Emerged thalli lost about 75% of the total cellular water during 6 hours of desiccation. Maximum water loss (86%) occurred after 1 day exposure to 50% relative humidity (r.h.), and then remained stable for 14 days. Water loss of more than 90% led to irreversible damage of the plants. After 7 or 14 days exposure to high humidity conditions the fresh weight of the thalli increased, indicating an uptake of water vapor. The ultrastructural features of desiccated thalli were studied without rehydration after embedding in Nanoplast FB 101 resin. Only slight changes in the fine structure became evident after desiccation times of up to 2 weeks. The very thick cell walls of *P. crispa* and the absence of vacuoles are regarded as essential prerequisites for the ability to survive periods of desiccation. (Auth. mod.)

B-47842

Culik, B.M., Wilson, R.P., **Field metabolic rates of instrumented Adélie penguins using double-labelled water**, *Journal of comparative physiology B*, 1992 162(6), p.567-573, 33 refs.

Adélie penguins carrying dummy instruments were used to determine field metabolic rates using double-labelled water. All penguins injected with double-labelled water showed a marked loss of body mass (-4.5%) during the period of the experiments (20-131 h), irrespective of the time of the breeding season. Total body water averaged 57.3% and water flux estimates of field metabolic rates correlated with double-labelled water estimates of field metabolic rate, indicating that Adélie penguins do not ingest significant amounts of sea water. Brooding Adélie penguins had a mean field metabolic rate of 10.1 W/kg and at sea a field metabolic rate of 13.3 W/kg. Mean field metabolic rate in penguins with crèching chicks was 14.1 W/kg, and the birds spent 65 h away from the nest. The effects of weather, disturbance and manipulation on the behavior and field metabolic rate of penguins late in the breeding season are discussed. Adélie penguins (crèching chicks) equipped with externally attached instruments spent more time absent from the nest than noninstrumented controls (76 vs 54 h), but had a lower field metabolic rate.

B-47843

Jazdzewski, K., De Broyer, C., **Morphology and systematic position of the antarctic and subantarctic synopiid *Cardenio paurodactylus* Stebbing, 1888 (Crustacea, Amphipoda)**, *Beaufortia*, Oct. 22, 1990 41(18), p.129-133, 25 refs.

Hitherto overlooked morphological characters of *Cardenio paurodactylus*, a common burrowing subantarctic and west antarctic amphipod, incline the authors to keep this species in the family Synopiidae. (Auth.)

B-47845

Niven, B.S., Abel, D.E., **Logical synthesis of environment of King Penguin, *Aptenodytes patagonicus***, *Ecological modelling*, 1991 56(1-4), p.291-311, Refs. p.309-311.

The environment of the King penguin, *Aptenodytes patagonicus*, is classified according to a mathematical definition of the animal environment. A semi-formalized logical 'sentence' is used to justify the inclusion of each object in the environment. The envirogram, a stylized diagram derived from the mathematical definition, shows each object in its logical place in the penguin's environment. (Auth.)

B-47846

Zdzitowiecki, K., **Little known and new antarctic *Digenea* species of genera *Neolepidapedon* and *Lepidapedon* (*Lepocreadiidae*)**, *Acta parasitologica polonica*, 1990 35(1), p.19-30, 16 refs.

Six of seven representatives of the genera *Neolepidapedon* and *Lepidapedon* occurring in fishes in the environs of the South Shetland

Is. and South Georgia are described, or redescribed: *N. trematomi* Prudhoe et Bray, 1973; *N. magnatestis* (Gaevskaya et Kovaleva, 1976) n. comb.; *N. opisthobifurcatus* sp. n.; *L. notogeorgianus* sp. n.; *L. tertius* sp. n.; and *L. paralebouri* sp. n. Hosts, the most heavily infested fish species, and location of the parasites in the fish intestines are noted. The seventh lepecreadiid species occurring in fishes in the investigated areas is *L. garrardi* (Leiper et Atkinson, 1914). (Auth.)

B-47847

Zdzitowiecki, K., **Reexamination of five antarctic and subantarctic digenean and acanthocephalan species from Professor Szidat's collection**, *Acta parasitologica polonica*, 1990 35(1), p.31-36, 14 refs.

Specimens of three trematode (in two cases the type specimens) and two acanthocephalan (in one case the type specimen) species were reexamined. *Lecithaster macrocotyle* Szidat et Graefe, 1967 is considered valid with *L. australis* Prudhoe et Bray, 1973 as a junior synonym. *Crassicutis antarcticus* Szidat et Graefe, 1967 is transferred to the genus *Neolebouria* and *N. georgiensis* Gibson, 1976 is its junior synonym. *Lepocreadium trullaeforme* of Szidat 1965 and Szidat and Graefe 1967 = *Lepidapedon garrardi* (Leiper et Atkinson, 1914). *Heteracanthocephalus hureaui* Dollfus, 1965 = *Aspersentis megarhynchus* (Linstow, 1892). *Hypoechinorhynchus magellanicus* Szidat, 1950 is transferred to the genus *Heterosentis*. (Auth.)

B-47848

Wojciechowska, A., ***Onchobothrium antarcticum* sp. n. (Tetraphyllidea) from *Bathyraja eatonii* (Günther, 1876) and a plerocercoid from *Notothenioidea* (South Shetlands, Antarctic)**, *Acta parasitologica polonica*, 1990 35(2), p.113-117, 3 refs.

Onchobothrium antarcticum sp. n. is the first species of the genus *Onchobothrium* to be described from an antarctic host. The characteristic features of the new species are as follows: hooks equal in length (0.10-0.11 mm), separated from each other, devoid of outgrowths, cushion-like lobe on the apex of each bothridium and presence in the distal part of the vagina of a constriction with a sphincter. Eggs, 0.11-0.16 mm in diameter, contain an embryo, 0.040-0.043 mm in diameter, bearing three pairs of equal hooks, 0.015-0.016 mm in length. Larvae of the *Scolex pleuronectis* type from the gut of *Notothenioidea* are 1.8- 4.3 mm in length, have trilocular bothridia without armature, and an apical sucker 0.098-0.146 mm in diameter. (Auth.)

B-47849

Zdzitowiecki, K., **Occurrence of acanthocephalans in fishes of the open sea off the South Shetlands and South Georgia (Antarctic)**, *Acta parasitologica polonica*, 1990 35(2), p.131-141, Refs. p.139-141.

The occurrence of acanthocephalans was investigated in fishes of the open sea in the environs of the South Shetlands and South Georgia. Acanthocephalans were found exclusively in demersal fishes. Nine species were noted in fishes off the South Shetlands and 10 in those off South Georgia (total number of species = 11). Predatory fishes were the most heavily infected. In both territories representatives of *Polymorphoidea*, for which fishes are paratenic hosts, were dominant, while *Echinorhynchoidea*, living in fishes in the adult stage, were less frequent and less numerous. In the author's opinion the fishes acquired infection with all species of acanthocephalans except *Corynosoma bullosum* and *Echinorhynchus petrotschenkoi* in fiords, not in the open sea. (Auth.)

B-47850

Wojciechowska, A., ***Pseudanthobothrium shetlandicum* sp. n. and *P. notogeorgianum* sp. n. (Tetraphyllidea) from rays in the regions of South Shetlands and South Georgia (Antarctic)**, *Acta parasitologica polonica*, 1990 35(3), p.181-186, 5 refs.

Descriptions of two new species of tapeworm of the genus *Pseudanthobothrium* (*Tetraphyllidea*), parasites of antarctic rays, are given. Both species are dominant in their hosts and usually occur in very large numbers. *Pseudanthobothrium shetlandicum* sp. n. is characterized by myzorhynchus in the form of a mushroom, cylindrical bothridia, each with a thickwalled sucker, 40-60 testes, thickening of the vaginal wall in the distal part, eggs measuring 0.043-0.055 x 0.040-0.047 mm, with oncosphere 0.017-0.021 in diameter and hooks 0.008-0.010 mm long. *Pseudanthobothrium notogeorgianum* sp. n. is characterized by cylindrical myzorhynchus with evertting disc, funnel-like bothridia, each with thinwalled sucker, 25-36 testes, vaginal wall of uniform thickness, eggs measuring 0.043-0.046 x 0.038-0.041 mm, with oncosphere 0.022-0.025 mm in diameter, and hooks 0.008-0.010 mm in length. Apolysis is characteristic of both species. (Auth.)

B-47852

Matsumoto, G.I., Torii, T., Han'ya, T., **Sterols and fatty acids in foams from antarctic lakes of the Dry Valleys in south Victoria Land**, *Geochemical journal*, 1985 19(2), p.91-96, 14 refs.

Sterols and fatty acids were studied for foam samples from lakes of Wright Valley, Lake Vanda and Lake Bull. Sterols, cholesta-5,22-dien-3 β -ol, cholest-5-en-3 β -ol, 24-ethylcholest-5-en-3 β -ol and 5 α -cholestan-3 β -ol, and fatty acids ranging from C10 to C28, including n-alkanoic, branched (iso and anteiso) and unsaturated acids were found in the foam samples. The dominant sterol was cholest-5-en-3 β -ol or 24-ethylcholest-5-en-3 β -ol. The sterol and fatty acid compositions of the foam samples are similar to those of epibenthic organisms (mainly cyanobacteria). The sources of the sterols and fatty acids are most likely cyanobacteria. In addition, these lipid components were concentrated considerably in the foams. (Auth.)

B-47853

Rowe-Rowe, D.T., Crafford, J.E., **Density, body size, and reproduction of feral house mice on Gough Island, South African journal of zoology**, Jan. 1992 27(1), p.1-5, 19 refs.

Feral house mice *Mus musculus* have existed on Gough I. for about 180 years. The population was sampled during the austral spring of 1990. Estimated density on a live-trapping grid in dense cover (woody plants, ferns, grass) near the coast was 224 mice/ha. Snap-trapping at high altitude, in open moorland and bog, indicated lower densities in exposed habitats. In overall size the mice were larger than *Mus musculus* from other localities, and larger than specimens collected on Gough I. during 1955-56. At the time of sampling 43% of adult females were pregnant or lactating and juveniles made up 14% of the trapped sample. The mean number of 9.2 fetuses per pregnant female suggests that litter size may be larger than those recorded in other feral mouse populations. Mice collected from high altitudes were smaller, and there were no juveniles in the sample. The inference is that breeding commences later at the cooler high elevations. (Auth.)

B-47857

Trunov, I.A., **Fish of the family Moridae from the southeastern Atlantic (Genera *Gadella*, *Halargyreus*, and *Antimora*)**, *Journal of ichthyology*, 1992 32(4), p.38-45, Translated from Voprosy ikhtiologii, 1991, 31(6). 21 refs.

Four species of fish of the family Moridae are examined: *Gadella imberbis*, *G. svetovidovi* sp. nov., *Halargyreus johnsonii*, and *Antimora rostrata*. The above species of the genus *Gadella* form a natural group, characterized by the presence of very short pear-shaped gill rakers. South Atlantic specimens of *H. johnsonii* differ from North Atlantic specimens. (Auth.)

B-47858

Kooyman, G.L., Ponganis, P.J., Thorson, P.H., Robisson, P., **Natural history of Ross Sea emperor penguin colonies**, *Antarctic journal of the United States*, 1991 26(5), p.181-182.

In this third season (1986, 1989) of the study of emperor penguin colonies in the Ross Sea, the central study site was Cape Washington. The authors conducted three major studies there, two of which were new to penguin studies: they were underwater observations of emperor penguin predator-avoidance strategies and satellite tracking of the birds. The latter was in collaboration with French scientists conducting nearly simultaneous tracking experiments at Dumont d'Urville. The analyses of the tracking studies are in progress; it appears that the penguins may routinely travel 200 km from the colonies during their approximately 10-day foraging trips.

B-47859

Veit, R.R., **Foraging interactions between pelagic seabirds and antarctic krill at South Georgia during austral winter 1991**, *Antarctic journal of the United States*, 1991 26(5), p.183-185, 5 refs.

The major objective of this study was to devise mathematical models that could predict the spatial dispersion of a population of seabirds, based on knowledge of the spatial dispersion of their major prey. Extensive data on the foraging behavior of the most common species of seabirds present were collected, and the findings are summarized as follows: krill is abundant but highly dispersed at South Georgia in winter; birds that eat krill are statistically associated in space with krill swarms; from the data, it is believed that foraging seabirds cue in on groups of feeding fur seals; and seabird species that feed on squid and fish forage in different places than do species which feed on krill. It is believed that pelagic birds alter their behavior near food patches.

B-47860

Matsuki, M., Testa, J.W., **Population ecology and satellite telemetry of Weddell seals (*Leptonychotes weddellii*) in McMurdo Sound**, *Antarctic journal of the United States*, 1991 26(5), p.185-186, 4 refs.

In the 1990-91 field season, the study of Weddell seal population dynamics in McMurdo Sound consisted of three research activities, which are described. These were a continuation of long-term monitoring of population dynamics of Weddell seal by tagging and censuses; evaluation of transponders as a permanent marker for Weddell seals; and recovery and redeployment of satellite-linked time-depth recorders on adult female Weddell seals.

B-47861

Holt, R.S., Hewitt, R.P., Rosenberg, J.E., **U.S. AMLR program: 1990-1991 field season activities**, *Antarctic journal of the United States*, 1991 26(5), p.187-188.

The field research project of the U. S. Antarctic Marine Living Resources (AMLR) program is designed to investigate and refine two hypotheses: that krill predators respond to changes in the availability of their food; and that the distribution of krill is determined by physical, chemical, and biological characteristics of the pelagic habitat. The specific objectives of the field season were to map the physical structure of the upper 750 m, including the thermohaline structure, oceanic fronts, water-mass boundaries, surface currents, eddies, and turbulent mixing; map the spatial distribution of phytoplankton biomass and phytoplankton production; map the spatial distribution of estimated krill biomass, including the horizontal and vertical variations in krill demography and growth; and to describe reproductive success, feeding ecology, and growth rates of land-based krill predators throughout the reproductive season on Seal Is.

B-47863

Nordhausen, W., **AMLR program: Horizontal separation of larval and adult *Thysanoessa macrura* around Elephant Island, Antarctica, during the 1991 austral summer**, *Antarctic journal of the United States*, 1991 26(5), p.190-193, 17 refs.

Thysanoessa macrura is the most widely distributed euphausiid in antarctic waters, frequently exceeding *Euphausia superba* in number. The author reports here on its distribution observed by conductivity-temperature-depth casts. This study was conducted during leg II of the Antarctic Marine Living Resources program (AMLR) from Feb. 16-Mar.17, 1991. One major objective of AMLR was to correlate the zooplankton data with data from other components of the program, including the hydrography, circulation patterns, phytoplankton biomass, and primary production.

B-47864

Holm-Hansen, O., Villafañe, V., Helbling, E.W., **AMLR program: Chlorophyll-a distribution and rates of primary production around Elephant Island**, *Antarctic journal of the United States*, 1991 26(5), p.194-196, 6 refs.

To determine the food reservoirs available to krill and to see if krill abundance is related to available food supply, the distribution and biomass of phytoplankton, as well as the rate of primary production, were investigated throughout the AMLR study area. Data regarding phytoplankton distribution were obtained using two methods: by continuous measurement of chlorophyll *a* (by *in vivo* fluorescence) and of beam attenuation (25 cm pathlength transmissometer) by using the ship's clean-water intake system, and by measurements in the upper 750 m of the water column at discrete stations in the sampling grid.

B-47865

Kocmur, S.F., Helbling, E.W., Holm-Hansen, O., **AMLR program: Nutrient concentrations and primary production around Elephant Island during AMLR 1989-1990**, *Antarctic journal of the United States*, 1991 26(5), p.197-200, 7 refs.

Nutrient studies were done as a part of the phytoplankton project with the objective of relating nutrient concentrations with different water masses, and also with the distribution of phytoplankton and krill. In this article the authors report on nutrient concentrations throughout the AMLR sampling grid as well as on rates of primary production. The AMLR 1989-1990 program consisted of two 1-month cruises, the first one in Jan. and the second in Feb. Hydrographic stations were occupied over a 185-by-185 km study area centered on Elephant I.

B-47866

Villafañe, V., Helbling, E.W., Holm-Hansen, O., **AMLR program: Size distribution and species composition of the phytoplankton crop around Elephant Island**, *Antarctic journal of the United States*, 1991 26(5), p.201-202, 10 refs.

The major objectives of this study were to assess the food reservoirs available to krill and to evaluate food availability as a factor that may influence the distribution and abundance of krill. In this paper the size distribution, biomass and dominant species of phytoplankton throughout the AMLR study area are reported. Preliminary analysis of the data suggest a relation between low microplankton populations north of Elephant I. and high krill concentrations in this area. Where krill were not in abundance (e.g., south of Elephant I.), the phytoplankton population apparently has a larger proportion of microplankton. This would be in agreement with the feeding preferences of krill.

B-47867

Macaulay, M.C., Mathisen, O., **AMLR program: Hydroacoustic observations of krill distribution and biomass near Elephant Island, austral summer 1991**, *Antarctic journal of the United States*, 1991 26(5), p.203-204, 5 refs.

The biomass of krill in the Elephant I. survey area during the first large-scale survey (survey A) was 0.5 to 1.0 million tons in 1990 and 0.6 million tons in 1991. This is an intermediate value between last year's first and second surveys. This year's survey A was conducted at approximately the same seasonal timing as the mid-point between last year's first and second surveys. The total biomass for the second survey (survey D) was slightly less than the total for survey A. The biomass for the Elephant I. area was higher, however, during survey D than during survey A, due to a high abundance of krill in deeper water northeast of Elephant I.

B-47868

Macaulay, M.C., **AMLR program: Spatial patterns in krill distribution and biomass near Elephant Island, austral summer 1991**, *Antarctic journal of the United States*, 1991 26(5), p.205-206, 3 refs.

Hydroacoustic survey data of the population of krill and other targets in the vicinity King George I. and Elephant I. were examined using spectral analysis to determine what spatial scales may be of importance in their distribution. This hydroacoustic data is part of a series of annual surveys conducted by the National Oceanic and Atmospheric Administration (NOAA) beginning in 1987 as part of the Antarctic Marine Living Resources (AMLR) program.

B-47869

Loeb, V.J., **AMLR program: Krill population structure in the Elephant Island area, January through March 1991**, *Antarctic journal of the United States*, 1991 26(5), p.206-208, 7 refs.

Net sampling was done to provide data on krill population structure in the Elephant I. area during the 1991 Antarctic Marine Living Resources (AMLR) field season. Demographic information included length, sex ratio, reproductive condition, and maturity stages. About 30,000 krill were collected and about 4,000 of these were sexed, staged, and measured. Measurements were of standard length; stages were based on the classification scheme of Makarov and Denys (1981). A summary of results from 98 large-scale survey bongo samples (pooled data from surveys A and D) is presented.

B-47870

Wormuth, J.H., Berkowitz, S., **AMLR program: Vertical distribution of krill in the vicinity of Elephant Island**, *Antarctic journal of the United States*, 1991 26(5), p.208-209, 4 refs.

Net sampling in the Elephant I. area was done as part of the 1991 AMLR program to provide data on krill. This report summarizes results on the vertical distribution of krill in the area. An example of the vertical structure of krill is shown in a figure. Generally, the best catches were between 40 and 100 m. The mean integrated value was 12.17 krill/sq m with 95% confidence intervals of ± 11.46 . There is no statistically significant vertical structure in sex ratio or size, at least not on the scale sampled. Some of the 1990 tows, by contrast, showed significant vertical structure in size-frequency distribution.

B-47873

Boveng, P.L., Bengtson, J.L., Goebel, M.E., **AMLR program: Antarctic fur seal foraging patterns at Seal Island, South Shetland Islands, Antarctica, during austral summer 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.215-216, 17 refs.

The foraging behavior of antarctic fur seals (*Arctocephalus gazella*) has been shown to reflect the availability of the seals' primary prey species, antarctic krill. To describe this predator-prey relationship more effectively, fur seals were studied at Seal I. during the 1990-91 field season. Fur seal pup growth rates were measured by weighing random samples of pups at regular intervals throughout the pup-rearing season. Also measured were the durations of foraging trips and pup-attendance visits of 39 female fur seals. Microprocessor-controlled time-depth recorders were used to record the diving behavior of 28 female fur seals as they foraged at sea to gain energy necessary for producing milk for nursing their pups ashore. The authors report here some of the results of these diving studies, based on dives made by 8 female fur seals during AMLR survey A, with an emphasis on the diel pattern of dive frequency and dive depth.

B-47874

Bengtson, J.L., Boveng, P.L., Jansen, J.K., **AMLR program: Foraging areas of krill-consuming penguins and fur seals near Seal Island, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.217-218, 1 ref.

During the 1990-91 austral summer field season, the authors undertook studies to identify and describe the ecological characteristics of the foraging areas of antarctic fur seals and penguins breeding at Seal I. Results suggest that foraging locations change within a breeding season as well as between years (the only direct comparison that can be made within this season is for fur seals.) The chinstrap penguin records from Jan. indicated that penguins were feeding up to twice as far offshore as observed in previous seasons. The pattern observed suggests that predator foraging areas may change within seasons in direct response to prey distribution and abundance.

B-47875

Croll, D.A., Jansen, J.K., Bengtson, J.L., **AMLR program: Reproductive performance of chinstrap penguins on Seal Island, South Shetland Islands, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.218-220, 8 refs.

Some of the results of reproductive factors measured for chinstrap penguins during the 1990-91 breeding season on Seal I. are reported and compared with observations from previous years. This shows that the number of chinstrap penguin chicks raised to creching on Seal I. in 1990-91 was lower than in the previous 3 years. Reduced chick production may have resulted from a number of possibilities: a decline in prey availability prior to breeding (resulting in fewer birds attempting to breed); a decline in prey availability during breeding (resulting in a higher nest failure rate during the early incubation period prior to the field team's arrival); both of these factors; or other factors such as weather or ice conditions. A comparison of data between 1989-90 and 1990-91 provides some clues about the possible timing of these interannual differences in environmental conditions.

B-47878

Sharp, T.R., Priscu, J.C., **Rates of primary production and growth for phytoplankton in Lake Bonney**, *Antarctic journal of the United States*, 1991 26(5), p.225, 3 refs.

Primary production of phytoplankton from the center of the east lobe of Lake Bonney was measured by the carbon-14 method at approximately weekly intervals from Oct. 30 to Jan. 11 during the 1990-91 season. Primary production measured in a single 24 hour incubation was shown to be equal to three 8 hour incubations. Seasonal primary production was 1.05 g of carbon/sq m. Chlorophyll *a* concentrations, a measure of phytoplankton biomass, increased over the sampling season. The decline in integrated (4.5 to 20 m) chlorophyll which occurred during Dec. is probably not caused by a loss of biomass but rather by dilution of the surface population by glacial meltwater. The growth rate estimated was low, 0.012 per day. This is equivalent to a doubling time of 56 days. Results show that the underice community was present at the start of the sampling season. Either phytoplankton growth occurred before the start of the field

season or some portion of the phytoplankton populations remains viable through the winter dark period. In addition, the phytoplankton may remain photosynthetically active through Mar. when adequate light still exists to drive photosynthesis.

B-47879

Lizotte, M.P., Priscu, J.C., **Natural fluorescence and photosynthetic quantum yields in vertically stable phytoplankton from perennially ice-covered lakes (dry valleys)**, *Antarctic journal of the United States*, 1991 26(5), p.226-228, 10 refs.

The natural fluorescence technique was tested for various stratified phytoplankton populations in the lakes of the McMurdo Dry Valleys. The authors measured natural fluorescence profiles, the phytoplankton variables relevant to models predicting chlorophyll and production, chlorophyll *a* concentrations, and primary production rates in Lake Bonney (east and west lobes), Lake Hoare and Lake Fryxell. The 3.0 to 4.5 m of ice cover on these lakes has one obvious advantage for measurements of natural fluorescence: red light is strongly attenuated by ice, effectively eliminating contamination of the upwelling signal by backscattered sunlight. Profiles of natural fluorescence as a function of available irradiance closely traced chlorophyll *a* concentrations but with an offset of approximately 1 m. Chlorophyll *a* concentration can be predicted from natural fluorescence based on the quantum yield of fluorescence and the chlorophyll *a* specific absorption coefficient for the phytoplankton. Thus, natural fluorescence appears to be an applicable technique for estimating chlorophyll *a* concentrations in stratified phytoplankton populations of the dry-valley lakes.

B-47881

Haftorn, S., Bech, C., Mehlum, F., **Aspects of the breeding biology of the antarctic petrel *Thalassoica antarctica* and the krill requirement of the chicks, at Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land**, *Fauna norvegica Ser. C., Cinclus*, 1991 14(1), p.7-22, With Norwegian summary. 14 refs.

In mid-Jan. 1985 the size of the antarctic petrel *Thalassoica antarctica* colony at Svarthamaren, situated about 200 km from the open sea at an altitude of 1600 m a.s.l., was estimated to be 575,000 birds, of which 28% were nonbreeders, presumably young birds. Hatching occurred synchronously during a short period in mid-Jan. The parents brooded the chicks continuously in alternate shifts that usually lasted for 3-4 days, until the chicks had become homeothermic at an age of approx. 11 days. Incubation shifts were evidently of the same duration. After this continuous brooding period, the parents attentive time declined to 12-30 minutes at each feeding visit, which first was on average every 4.3 days, shortening to 1.4 days over the next 4 weeks. The chicks were mainly fed with krill. The average amount was 146 g per visit. The total amount of krill brought back to the colony during the breeding season was estimated to be 1100-1400 tons. The antarctic petrels readily accepted foster chicks placed experimentally in the nest, at least during the first month after hatching. (Auth.)

B-47882

Haftorn, S., Bech, C., Mehlum, F., **Notes on the south polar skua *Catharacta Maccormicki* breeding at Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land**, *Fauna norvegica Ser. C., Cinclus*, 1991 14(1), p.47-48, With Norwegian summary. 7 refs.

On the boulder-littered base of Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land, 50 territorial pairs of the South Polar Skua *Catharacta maccormicki* were breeding in 1985. The mountain slope above the skuas was inhabited by a huge colony of the antarctic petrel *Thalassoica antarctica* (about 575,000 birds), together with a few hundred Snow Petrels *Pagodroma nivea*. This area was

visited between Jan. 11 and Feb. 15. Although the petrels were the main study objects, some observations were made on the skuas; these are reported here. Svarthamaren is situated about 200 km from the open sea, at an altitude of 1600 m a.s.l. (Auth. mod.)

B-47883

Röv, N., **Density of breeding and non-breeding antarctic petrels at Svarthamaren, Dronning Maud Land, 1990**, *Fauna norvegica, Ser. C., Cinclus*, 1991 14(2), p.49-53, With Norwegian summary. 8 refs.

The number of occupied nests of antarctic petrels *Thalassoica antarctica* was counted in 96 study plots, each 3x3 m, on 24-25 Jan. 1990. The procedure was the same as in 1985, when the mean density was estimated at 0.76 pairs/sq m. In 1990, the mean breeding density varied between 0.56 and 0.99 within different parts of the colony. Approximately 30% of the nests were occupied by non-breeders, the same as in 1985. A negative correlation was found between the numbers of breeding and non-breeding birds within the study plots, suggesting competition for nest sites. The overall breeding density in 1990 was estimated to be 0.63 nests/sq m, which is 17% lower than in 1985. No change in the colony area could be detected. It was therefore concluded that the total number of breeding pairs in 1990 was significantly lower than in 1985. (Auth.)

B-47884

Nicolaus, B., **Isolation of extremely halotolerant cocci from Antarctica**, *FEMS microbiology letters*, 1992 99(2-3), p.145-149, 30 refs.

Five non-motile Gram-positive cocci were isolated from saline soils located in geothermal regions of the antarctic continent. The organisms were extremely halotolerant, growing between 0 and 4.2 M NaCl. On the basis of the results of phenotypic characterizations, lipid and quinone analyses, and the amino acid composition of the cell wall, the isolates have been assigned to the genus *Micrococcus*. (Auth.)

B-47888

Studencka, B., **New species of genus *Panopea* (Bivalvia) from King George Island, Antarctica**, *Polish polar research*, 1991 12(3), p.363-368, With Polish summary. 7 refs.

A new species of genus *Panopea* Ménard de la Groye, named *P. (P.) andreae* sp. n. is described in detail. It is the most common of bivalve species recorded in the Destruction Bay Formation (Early Miocene) of King George I. The bivalve material collected includes in addition: *P. (P.) aff. worthingtoni* Hutton, *Eurhomalia cf. antarctica* (Shermann and Newton) and *E. cf. newtoni* (Wilcknes). (Auth.)

B-47890

Jazdzewski, K., De Broyer, C., Teodorczyk, W., Konopacka, A., **Survey and distributional patterns of the amphipod fauna of Admiralty Bay, King George Island, South Shetland Islands**, *Polish polar research*, 1991 12(3), p.461-472, 28 refs.

The paper presents a list of over 100 amphipod taxa hitherto recorded in Admiralty Bay, South Shetlands. Distributional patterns of Amphipoda in upper and middle sublittoral (depth 5-150 m) of Admiralty Bay are also given. Notes on the taxonomy of some taxa are presented. (Auth.)

B-47891

Dahms, H.U., Pottek, M., ***Metahuntemannia* Smirnov, 1946 and *Talpina* gen. nov. (Copepoda, Harpacticoida) from the deep-sea of the high antarctic Weddell Sea with a description of eight new species**, *Microfauna marina*, 1992 Vol.7, p.7-78, With German summary. 19 refs.

The taxon *Metahuntemannia* Smirnov, 1946 is subdivided into the two sister-taxa *Metahuntemannia* s. str. and *Talpina* gen. n. The findings of new constitutive characters and a reevaluation of characters already known lead to the establishing of the new taxon, *Talpina* gen. n., which represents the former *talpa*-group *sensu* Becker (1979) of *Metahuntemannia* s.l. Representatives of the *spinosa*-group which have been described earlier belong to *Metahuntemannia*. *Beckeria* Por, 1986 is synonymized with *Metahuntemannia*. Material obtained during 3 expeditions of RV *Polarstern* to the Weddell Sea yielded 8 new species revealing a very high diversity. Three of the 8 new species belong to *Metahuntemannia* and 5 to *Talpina*. All species seem well adapted for an inbenthic mode of life as evidenced by a cylindrical body shape, stout appendages, spiniform setae on the antennules, reductions in the locomotory leg endopodites and setal lengths of the exopodites. In *Talpina* the P1 is highly specialized for a digging function as indicated by an elongated coxa, a medially flexed exopodite and stout exopodal segments armed with spiniform setae forming a shovel together with the reduced endopodite. A reevaluation of zoogeography and phylogenetic relationships among *Metahuntemannia* and *Talpina*, and a key for the identification, are given. (Auth. mod.)

B-47894

Vladimirskaya, E.V., Khromov, N.S., **Results of plankton studies conducted by VNIRO on board the R/V Akademik Knipovich in the Antarctic** [Rezultaty planktonnykh issledovaniy VNIRO na NPS Akademik Knipovich v Antarktike], Rybokhoziaistvennye issledovaniia planktona. Ch. 1. Okean, kraevye moria: sbornik nauchnykh trudov (Fisheries-related studies of plankton. Part 1. Ocean and marginal seas: collected scientific papers). Edited by V.I. Kuz'micheva, Moscow, VNIRO, 1991, p.4-18, In Russian with English summary. 24 refs.

Results of investigations carried out since 1965 during 14 six-month expeditions to the Scotia, Lazarev, Cosmonaut and Commonwealth seas are summarized. Secondary frontal zones were recorded on the basis of differences in the phenological state of plankton. The "coastal oasis" phenomenon off the Antarctic Peninsula is described as affecting the functioning of neritic communities in the marginal seas. Extensive data on the total biomass of plankton and on the ratio between zoo- and phytoplankters are provided. (Auth. mod.)

B-47895

Men'shenina, L.L., **Seasonal aspects of the distribution of *Thysanoessa* spp. off South Georgia** [Sezonnye aspekty raspredeleniia *Thysanoessa* spp. u ostrova Iuzhnaia Georgiia], Rybokhoziaistvennye issledovaniia planktona. Ch. 1. Okean, kraevye moria: sbornik nauchnykh trudov (Fisheries-related studies of plankton. Part 1. Ocean and marginal seas: collected scientific papers). Edited by V.I. Kuz'micheva, Moscow, VNIRO, 1991, p.18-36, In Russian with English summary. 12 refs.

Analysis of the distribution of larvae and postlarvae in the summer and autumn of 1971, 1981 and 1985 has revealed an isolated shelf area differing from the oceanic one in abundance and age composition of *Thysanoessa* at the expense of the disappearance of younger stages in the coastward direction. This distribution pattern seems to be due to a higher mortality rate of eggs and early larvae above shallows as compared to deep-sea areas, and to the oceanic origin of postlarvae which are brought to the shelf areas with free inflow of oceanic waters. (Auth.)

B-47896

Karpinskiĭ, M.G., **Plankton distribution in the subantarctic areas of the Pacific Ocean in the autumn and winter of 1983** [Raspredelenie planktona subantarkticheskikh vod Tikhogo okeana osen'iu-zimoĭ 1983], Rybokhoziaistvennye issledovaniia planktona. Ch. 1. Okean, kraevye moria: sbornik nauchnykh trudov (Fisheries-related studies of plankton. Part 1. Ocean and marginal seas: collected scientific papers). Edited by V.I. Kuz'micheva, Moscow, VNIRO, 1991, p.36-42, In Russian with English summary. 5 refs.

Based on the results of surveys conducted in 3 areas of the 40th and 50th parallel in the southwest Pacific, it was concluded that plankton biomass varied between 1 and 7g/sq m and it was as high as 10-12g/sq m in the frontal zones and the areas of active water mixing, which is by an order or more lower than in summer. The species composition appeared to be poor and was represented by 3-4 mass species common for the southern transitional zone and several species introduced from the south or north. (Auth.)

B-47897

Bargagli, R., Battisti, E., Focardi, S., Formichi, P., **Preliminary data on environmental distribution of mercury in northern Victoria Land, Antarctica**, *Antarctic Science*, Mar. 1993 5(1), p.3-8, 36 refs.

Concentrations of mercury were measured in soil and in two species of epilithic macrolichens (*Umbilicaria decussata* and *Usnea antarctica*) collected along the coast of northern Victoria Land. Most of the soil samples had a very low mercury content, whereas lichens had levels higher than in other remote areas. Although a possible contamination of samples cannot be completely excluded, the relevance to bioaccumulation of the very slow growth rate of lichens and of volcanic activity are discussed. (Auth.)

B-47898

Bengtson, J.L., Croll, D.A., Goebel, M.E., **Diving behaviour of chinstrap penguins at Seal Island, Antarctica**, *Science*, Mar. 1993 5(1), p.9-15, 33 refs.

Diving behavior of chinstrap penguins (*Pygoscelis antarctica*) was studied in 4 adults brooding chicks on Seal I. During foraging trips to sea, chinstrap penguins made shallow, short duration dives almost continuously, for the most part within 50 m of the surface. Diving effort was concentrated during the daylight hours (10h00-15h00), although a second peak in effort was seen around midnight (22h00-02h00). These peaks were possibly due to the constraints of visual location of prey, chick provisioning, or the need to take advantage of diurnal changes in krill swarm densities or behavior. It was estimated that most effort was concentrated 3-20 km from shore. Dive depth and duration averaged 31.0 m (+/- 26.3 m) and 72s (+/- 36s), respectively. Maximum dive depth and duration were 121 m and 180s, respectively. (Auth.)

B-47899

Boyd, I.L., **Pup production and distribution of breeding antarctic fur seals (*Arctocephalus gazella*) at South Georgia**, *Antarctic Science*, Mar. 1993 5(1), p.17-24, 33 refs.

A census of the breeding population of antarctic fur seals at South Georgia was carried out during the 1990/91 breeding season. Using counts of adult females ashore at the breeding grounds during the pupping period, together with corrections for the likelihood of a female being ashore at a census and for pregnancy rate (71% in 1990/91), pup production was estimated as 269,000 (95% confidence intervals 188,000-350,000). The breeding population in 1990/91 was reduced at long-term study sites probably because of limited food

availability. Data from these sites were used to estimate the pup production of the population had 1990/91 been a typical year. Based on values from 1983/84 to 1990/91, pup production in 1990/91 would have been 378,000 (se=19,000) if it had been an average year. The annual increase in pup production from 1976/77 to 1990/91 has declined to 9.8% since the initial period of population expansion in the 1950s and 1960s. Increased population size has led to an expansion of the breeding range at South Georgia. (Auth.)

B-47900

Helbling, E.W., **Phytoplankton distribution and abundance as related to a frontal system north of Elephant Island, Antarctica**, *Antarctic Science*, Mar. 1993 5(1), p.25-36, Refs. p.35-36.

During Jan.-Mar., 1991, the distribution and floristic composition of the phytoplankton around Elephant I., Clarence I. and the northern end of King George I. were determined in relation to physical oceanographic conditions and to proximity of the shelf-break and continental slope. The study area included 180 stations and c. 5,400 km of transects, providing continuous measurements of salinity, temperature, beam attenuation, and chlorophyll *a* concentrations in surface waters. The richest phytoplankton areas were generally found associated with a strong salinity front, extending north of King George I. to north of Elephant and Clarence Is. Data on the phytoplankton community suggest that shelf waters were characterized by low biomass and a nanoplankton population, while in and just north of the front the biomass increased and there was a shift to a diatom-dominated microplankton population. This is thought to be related to increased stability of the water column just north of the front. The salinity front ran more or less parallel to the continental shelf-break, but its exact position varied during the period of study. (Auth. mod.)

B-47901

Hennion, F., Couderc, H., **Cytogenetical variability of *Ranunculus* species from Iles Kerguelen**, *Antarctic Science*, Mar. 1993 5(1), p.37-40, 10 refs.

New cytogenetical data are provided for the three *Ranunculus* species occurring on Kerguelen Is. Chromosome morphometrical analysis (idiograms) strongly argues for a relationship between them, with some indications of a more recent origin for *R. moseleyi*. Aneuploidy was found within the three species for the first time. Whilst only a slight aneuploidy exists in *R. pseudotrullifolius* and *R. moseleyi*, *R. biternatus* shows a tendency to hyperaneuploidy. Vegetative reproduction is likely to increase the number of plants showing such chromosome number irregularities. Aneuploidy could explain some of the differences among the species in ecological tolerance and distributional area. (Auth.)

B-47902

Kaup, E., Haendel, D., Vaikmäe, R., **Limnological features of the saline lakes of the Bunger Hills (Wilkes Land, Antarctica)**, *Antarctic Science*, Mar. 1993 5(1), p.41-50, 19 refs.

Twelve saline lakes 5-35 m above sea level in Bunger Hills were investigated from Jan. to Apr. 1987-89. Some lakes may be relict, and all were subject to wind-borne marine salts with present salinities between 3.4-79.0 per mill and $\delta^{18}O$ -18 values mostly between -10 to -14‰. Temperatures up to 17.7 °C were measured at the bottom of Lake Polest where a sharp thermohalocline was observed during the period of open water. Mg^{2+} predominated over Ca^{2+} in all the lakes. Phosphate concentration was 3-10 microgramP/l and total phosphorus 8-16 microgramP/l. The concentrations of nitrates and nitrites were often equal, ranging between 1-4 microgramN/l. Dissolved O_2 was usually near saturation levels, but peaked at more than 230% of saturation in the hypolimnion of Lake Polest as a result of temperature-enhanced photosynthesis. The values for primary production were an order of magnitude higher than in the freshwater lakes of the Bunger Hills. (Auth. mod.)

B-47903

Radtke, R.L., Hubold, G., Folsom, S.D., Lenz, P.H., **Otolith structural and chemical analyses: the key to resolving age and growth of the antarctic silverfish, *Pleuragramma antarcticum***, *Antarctic Science*, Mar. 1993 5(1), p.51-61, Refs. p.59-61.

The various life history stages of the Weddell Sea population of *Pleuragramma antarcticum* were sampled to investigate its life-history patterns. Otoliths were examined for size, morphology and microstructure. External and internal examination of otoliths by scanning electron microscopy revealed internal increments (assumed to be daily) and hatching marks. Back calculation of hatching dates from otolith increments suggested a hatching season from Sep.-Nov., with recruitment to the adult population at 3-5y of age. Growth data conformed well to the von Bertalanffy equation. Fish grew slowly, with the largest fish attaining ages of more than 30 years. A multivariate mathematical model relating age to otolith morphometrics and fish size proved reliable, making it possible to age large sample sizes of fish. Limited elemental microprobe data obtained from two otoliths demonstrated patterns which may be useful in indicating the environmental life history of individual fish. These collective data suggest that the ecological importance of populations of *P. antarcticum* is most likely due to a long life span and high lifetime reproduction rate. (Auth. mod.)

B-47913

Fiala, M., Delille, D., **Variability and interactions of phytoplankton and bacterioplankton in the antarctic neritic area**, *Marine ecology progress series*, Nov. 30, 1992 89(2-3), p.135-146, Refs. p.144-146.

The distributions of phytoplankton biomass and bacterial populations were investigated at 37 stations on the continental shelf of Adélie Coast during summer 1989. Despite a potentially favorable environment, phytoplankton biomass was relatively low. The highest numbers of heterotrophic bacteria were recorded in the immediate vicinity of penguin rookeries and the lowest in offshore waters. Bacterial biomass represents between 2 to 15% of total microbial biomass in offshore waters and up to 30% in the coastal area. There was no direct correlation between bacterial and phytoplanktonic standing stocks. This lack of relationship can be explained by considering the differences in scale. It is suggested that in the coastal area where large diatoms are dominant, the bacteria are mainly dependent on organic matter introduced by bird manuring. On the other hand, in offshore waters where the dominant phytoplankton fraction under 10 microns represents a large part of the microbial loop, an indirect relationship between algae and bacteria may be expected. (Auth. mod.)

B-47914

Nicol, S., **Growth and shrinkage of antarctic krill *Euphausia superba* from the Indian Ocean sector of the southern ocean during summer**, *Marine ecology progress series*, Nov. 30, 1992 89(2-3), p.175-181, 23 refs.

Growth rates of krill in the Prydz Bay area were measured during 4 summers using an 'instantaneous growth rate' technique which involved measuring the mean change in length of the uropods at moulting. In the first 4 d following collection, mean growth rates ranged from 0.35 to 7.34% per moult in adults and 2.42 to 9.05% in juveniles. Mean growth rates of adult and juvenile krill differed between areas and between the different years of the investigation. When food was restricted under experimental conditions, individual krill began to shrink immediately and mean population growth rates decreased gradually, becoming negative after as little as 7 d. Populations of krill which exhibited higher initial growth rates began to shrink later than those which had initially been growing more slowly. (Auth.)

B-47915

Rodhouse, P.G., Symon, C., Hatfield, E.M.C., **Early life cycle of cephalopods in relation to the major oceanographic features of the southwest Atlantic Ocean**, *Marine ecology progress series*, Nov. 30, 1992 89(2-3), p.183-195, Refs. p.194-195.

Cephalopod paralarvae and juveniles were sampled with RMT8 and Bongo nets during 2 cruises of the MV *Falklands Protector* in the southwest Atlantic Ocean in Oct./Nov. 1990 and 1991. Each cruise had 2 phases, a northern phase over the Patagonian Shelf edge and adjacent waters, and a southern phase over the shelf around the Falkland Is. Vertical temperature profiles were used to identify the major fronts and water masses. The subantarctic surface water of the Falkland Current contained the richest assemblage of species and was characterized by the subtropical/subantarctic *Histioteuthis atlantica*, the subantarctic *Batoteuthis skolops*, *H. eltaninae*, *H. macrohista* and the subantarctic/antarctic *Gonatus antarcticus*. With the exception of some small *G. antarcticus*, the polar front zone water of the Falkland Current was relatively poor in species. The Falkland Is. shelf yielded *Loligo gahi*, *G. antarcticus*, *Martialia hyadesi*, *Moroteuthis knipovitchi*, *B. skolops*, *Semirossia patagonica* and an *Octopus* sp. The data provide new information on the life cycles of *M. hyadesi* and *G. antarcticus* and are consistent with the view that *L. gahi* reproduces in shallow water around the Falkland Is. with 1 major brood spawning in the late austral winter. (Auth. mod.)

B-47916

Mayzaud, P., Roche-Mayzaud, O., Razouls, S., **Medium term time acclimation of feeding and digestive enzyme activity in marine copepods: influence of food concentration and copepod species**, *Marine ecology progress series*, Nov. 30, 1992 89(2-3), p.197-212, Refs. p.211-212.

Inter-species differences in the acclimation strategy of the nutritional processes (ingestion, digestive enzyme activity) of female and copepodite stage V copepods were established experimentally for 3 different species: *Acartia clausi*, *Eurytemora herdmani*, and *Drepanopus pectinatus*. In all experiments food was supplied over 4 to 7 d at 2 limiting concentrations of the cultured diatom *Skeletonema costatum*. The first 3 experiments confirmed earlier results suggesting that under food limiting conditions, *Acartia*-type copepods (low level of energy reserve, high turnover of its biomass) displayed positive acclimation of both ingestion rate and digestive system. Despite larger food rations, experiments with the lipid-rich species *D. pectinatus* failed to show any acclimation of digestive enzyme activities, except for individuals collected before a summer bloom which displayed partial positive acclimation of their trypsin activity. These inter-species differences agree with the hypothesis that internal control of the acclimation process is governed by the metabolic requirement of the animals. In addition, the differential response of *D. pectinatus* collected before and after a phytoplankton bloom suggests an important role for past feeding conditions (physiological memory), thus explaining the variability in responses between natural field conditions and laboratory conditions. Physiological adaptation is proposed as a mechanism which minimizes the effect of stressful trophic conditions. (Auth. mod.)

B-47917

Vosjan, J.H., Pauptit, E., **Penetration of photosynthetically available light (PAR), UV-a and UV-b in Admiralty Bay, King George Island, Antarctica**, *Circumpolar journal*, 1992 No.1-2, p.50-58, 11 refs.

Since increased UV-b penetrating the water column might influence marine ecosystems, the penetration of various forms of radiation (UV-b, UV-a and PAR) in coastal waters of Admiralty Bay was studied. The attenuation of the light was measured with International

Light photodetectors: the photosynthetically available radiation (PAR) detector, with wavelengths between 400 and 800 nm; the UV-a detector, with wavelengths between 300 and 400 nm (maximum at 360 nm); and the UV-b detector, with wavelengths between 260 and 350 nm (maximum at 290 nm). The resulting attenuation coefficients were found to be much higher than the values found in other coastal areas of the world, because in Antarctica there is no river influx carrying suspended materials and humic acids which scatter and absorb these radiations. (Auth. mod.)

B-47919

Wiegmann-Haass, R., **On the taxonomy and distribution of the species *Hyperoche Bovallius* 1887 in the polar South Atlantic** [Zur Taxonomie und Verbreitung der Gattung *Hyperoche* Bovallius 1887 im antarktischen Teil des Atlantik (Crustacea: Amphipoda: Hyperiidea)], *Senckenbergiana biologica*, Jan. 31, 1991 71(1/3), p.169-179, In German with English summary. 8 refs.

Results of taxonomic investigations on numerous materials of *Hyperoche luetkenides* Walker 1906 and *H. capucinus* Barnard 1930 are reported. Both species have a circumpolar distribution covering the area of West and East Wind Drift. Their occurrence coincides with the shelf ice in the inner Weddell Sea. (Auth.)

B-47920

Wiegmann-Haass, R., **Taxonomy and distribution of *Vibilia antarctica* in the polar South Atlantic** [Taxonomie und Verbreitung von *Vibilia antarctica* Stebbing 1888 im antarktischen Teil des Atlantik (Crustacea: Amphipoda: Hyperiidea)], *Senckenbergiana biologica*, Oct. 15, 1990 70(4/6), p.419-428, In German with English summary. 20 refs.

Results are presented of taxonomic investigations on numerous materials of *Vibilia antarctica* Stebbing 1888. A brief diagnosis for the species is given. *V. antarctica* is clearly distinguished from *V. stebbingi* and *V. propinqua*. It is the only species of *Vibilia* living in antarctic waters. Its distribution is circumpolar within the West Wind Drift, but in cold areas near the coast, areas of the East Wind Drift, it is absent.

B-47921

Brandt, A., **Redescriptions of the antarctic fish parasites *Aega glacialis* Tattersall, 1921 and *Aega antarctica* Hodgson, 1910**, *Senckenbergiana maritima*, Sep. 2, 1991 21(5/6), p.215-232, With German summary. 7 refs.

Redescriptions of *Aega glacialis* Tattersall, 1921 and *Aega antarctica* Hodgson, 1910 are presented. These species are the most common representatives of the Aegidae within antarctic waters. They can easily be distinguished from each other by the size of the eyes, which are much larger in *A. glacialis*, and the length and posterior margin of the pleotelson. The pleotelson of *A. glacialis* is shorter and bears 10-14 denticles. *A. antarctica* bears 5-7 denticles on the posterior margin of the pleotelson. (Auth.)

B-47922

Brandt, A., Wägele, W., **Parasitic Isopoda of the family Gnathiidae from the Atlantic Sector of the southern ocean. Redescription and remarks on the synonymy**, *Senckenbergiana maritima*, Sep. 2, 1991 21(5/6), p.233-261, With German summary. 12 refs.

A collection of gnathiids from the Atlantic Sector of the southern ocean is studied. Owing to the incomplete and poor taxonomic descriptions of antarctic Gnathiidae combined with a problematic synonymy of four species, redescriptions of *Gnathia antarctica* (Studer, 1883), *Gnathia polaris* Hodgson, 1902, *Gnathia hodgsoni* Vanhöffen, 1914, and *Euneognathia gigas* (Beddard, 1886) are presented on the

basis of the type material. The synonymy of the species is also discussed. (Auth.)

B-47924

Bustamente, J., Cuervo, J.J., Moreno, J., **Function of feeding chases in the chinstrap penguin, *Pygoscelis antarctica***, *Animal behaviour*, 1992 44(4), p.753-759, 19 refs.

Crècheing chinstrap penguin chicks chase their parents on the run before being fed. This characteristic behavior of Pygoscelid penguins has been interpreted in several ways. In an observational study of several colonies in a rookery on Deception I., South Shetlands, the frequency and duration of feeding chases in families with one and two chicks were compared. Significantly more feedings occurred outside the crèche in two-chick than in one-chick families. Chases were significantly more frequent and prolonged in families with two than in those with single chicks. This difference was independent of the number of chicks present in the interactions (one or two siblings in two-chick families). Chases during feedings by single chicks were significantly less frequent and prolonged than those by one chick when its sibling was absent. Siblings chasing more intensively obtained more feedings. There was no increase in chasing effort with chick age. These results suggest that feeding chases allow parents to regulate food distribution between siblings according to their needs or hunger but they could also allow brood reduction in times of food crises. (Auth.)

B-47933

Vestal, J.R., **Antarctic cryptoendolithic microbial ecosystem as a model for studying microbes in shale and coal**, *Resources conservation and recycling*, May 1991 5(2-3), p.133-144, 40 refs.

In Antarctica there exists a complete microbial ecosystem that lives hidden within the pore spaces of sandstone (cryptoendolithic). Studying microbes within this solid matrix has presented certain technical problems which have been overcome. This has allowed studies to be conducted that have shown the effects of the physical and chemical environment on growth and metabolism of the microbes in these rocks. Similar microbial communities have recently been discovered that can exist within the solid matrix of shale and coal. Even though the community and environment are different from the antarctic microbes, many of the methods and hypotheses regarding their existence are the same. Answers to questions relating how and why these microbes exist in shale and coal may have important implications for coal desulfurization, or degradation of the shale matrix to release hydrocarbons. (Auth.)

B-48007

Tanimura, A., Matsuda, O., Ishikawa, S., Kawaguchi, K., **Zooplankton data collected with BIOMASS Programme at Syowa Station in 1984 by JARE-25, Japanese Antarctic Research Expedition**. *JARE data reports*, Dec. 1992 No.183, 57p., 2 refs.

This report summarizes data on zooplankton collected in the JARE-25 wintering-over program in 1984. A total of 52 samples were obtained with two kinds of Norpac nets (45 cm in diameter and 180 cm in side length) during Feb. 1984 through Jan. 1985 as shown in a table. The mesh openings of the nets were 25 microns (P25 net) and 330 microns (GG54), respectively. The results of primary sorting are presented here.

B-48008

Tanimura, A., **Zooplankton data collected with BIOMASS Programme at Syowa Station in 1983 by JARE-24, Japanese Antarctic Research Expedition**. *JARE data reports*, Dec. 1992 No.182, 71p., 2 refs.

This report summarizes data on zooplankton collected in the JARE-24 wintering-over program in 1983. A total of 66 samples were obtained with a twin-ring Norpac net (45 cm in diameter and 180 cm in side length) during Feb. 1983 through Jan. 1984. The mesh openings of the nets were 25 microns (P25 net) and 100 microns (NXX13 net), respectively. The results of primary sorting are presented here.

B-48009

Tarnawski, M., **In situ carbon dioxide levels in cushion and turf forms of *Grimmia antarctici* at Casey Station, East Antarctica**, *Journal of bryology*, 1992 17(2), p.241-249, 18 refs.

Grimmia antarctici is abundant on the Bailey and Clark Peninsulas, Wilkes Land. It grows as a turf in wet locations and as cushions at relatively dry sites. This paper documents substantial differences in the internal CO₂ concentration of cushion and turf communities during the growing season. In Nov., CO₂ levels in the rhizo/phyllplane of both growth forms were close to ambient (around 350 ppm). Over the next two months the levels increased tenfold in turf but remained essentially constant in cushions. This means that the actively growing shoot tips of turf would be photosynthesizing at optimal CO₂ concentration (i.e. close to CO₂ saturation) for most of the summer. Photosynthesis in cushions, on the other hand, would be severely limited by CO₂. These findings may account for the observations made at the same field sites in Jan. 1986, that turf photosynthesizes at higher rates than cushions under simulated field conditions and is more resistant to photoinhibition. (Auth. mod.)

B-48010

Smith, V.R., Steenkamp, M., **Soil macrofauna and nitrogen on a sub-Antarctic island**, *Oecologia*, 1992 92(2), p.201-206, Refs. p.205-206.

The densities, diet and habitat preferences of the soil macrofaunal species on Marion I. are described. Their role in N cycling on the island is assessed, using a mire-grassland community as an example. Although soil macroinvertebrates and bacteria represent a very small fraction of the total N pool, their interaction accounts for most of the peat N mineralization, as indicated by the amounts of inorganic N released into solution in microcosms. Extrapolation of the microcosm results shows that the soil macrofauna (mainly earthworms) stimulate the release of enough N from the mire-grassland peat to account for maximum N mineralization rates calculated from temporal changes in peat inorganic N levels and plant uptake during the most active part of the growing season. Since large numbers of meso- and microinvertebrates occur and must also contribute to nutrient mineralization, the soil faunal component is clearly of crucial importance to nutrient cycling on Marion I. This is probably true of all subantarctic islands. (Auth. mod.)

B-48027

Arrigo, K.R., Sullivan, C.W., **Influence of salinity and temperature covariation on the photophysical characteristics of antarctic sea ice microalgae**, *Journal of phycology*, Dec. 1992 28(6), p.746-756, 50 refs.

The response of sea ice microalgae to variation in ambient irradiance, temperature, and salinity were tested to determine whether these variables act independently or in concert to influence rates of microalgal photosynthesis. The photosynthetic efficiency and maximum photosynthetic rate for sea ice microalgae increased as a function of incubation temperature between -6 and +6 C. Furthermore, photosynthetic efficiency, maximum photosynthetic rate, and quantum yield were greatest at salinities between 30 and 50 ppt. In contrast, the mean specific absorption coefficients were lowest near seawater salinities, and the saturating irradiance appeared to be inversely proportional to salinity. Results also suggest that the effects of salinity on the growth of sea ice microalgae are independent

of those elicited by temperature or light, and that the functional relationship between salinity and light or temperature is multiplicative. This information is essential to the proper formulation of algorithms used to describe algal growth in environments where light, temperature, and salinity are changing simultaneously, such as within sea ice or within the water column at the marginal ice edge zone. (Auth.)

B-48033

Crockett, E.L., Sidell, B.D., **Substrate selectivities differ for hepatic mitochondrial and peroxisomal beta-oxidation in an antarctic fish, *Notothenia gibberifrons***, *Biochemical journal*, Jan. 15, 1993 289(2), p.427-433, 41 refs.

Hepatic mitochondrial and peroxisomal *beta*-oxidation were examined in an antarctic marine teleost, *Notothenia gibberifrons*. Enzymic profiles and rates of *beta*-oxidation by intact organelles were determined by using a range of fatty acyl-CoA substrates to evaluate substrate preferences. Partitioning of *beta*-oxidation between organelles was estimated. Substrate selectivities are broader for peroxisomal *beta*-oxidation than for mitochondrial *beta*-oxidation. Most polyunsaturated acyl-CoA esters measured appear to inhibit by over 40% the oxidation of palmitoyl-CoA by peroxisomes. The findings suggest that the polyunsaturates eicosapentaenoic acid and docosahexaenoic acid, found in high concentrations in antarctic fishes, are utilized as fuels to support aerobic energy metabolism. Metabolic capacities of rate-limiting enzymes and *beta*-oxidation rates by intact organelles indicate that up to 30% of hepatic *beta*-oxidation in *N. gibberifrons* can be initiated by the peroxisomal pathway. (Auth. mod.)

B-48034

Dobson, S.J., Colwell, R.R., McMeekin, T.A., Franzmann, P.D., **Direct sequencing of the polymerase chain reaction-amplified 16S rRNA gene of *Flavobacterium gondwanense* sp. nov. and *Flavobacterium salegens* sp. nov., two new species from a hypersaline antarctic lake**, *International journal of systematic bacteriology*, Jan. 1993 43(1), p.77-83, 29 refs.

Phenotypic data and phospholipid ester-linked fatty acid profiles indicate that pigmented bacterial strains isolated from a hypersaline antarctic lake are members of the "flavobacterium-bacteroides" phylum and may represent new taxa. Nearly complete 16S rRNA sequences were obtained for representative strains by directly sequencing the polymerase chain reaction-amplified 16S rRNA gene. Sequence signatures confirmed that these organisms were members of the flavobacterium-bacteroides phylum. A phylogenetic analysis, in which the sequences of the antarctic strains were compared with a large number of sequences available for members of the flavobacterium-bacteroides phylum, showed that the antarctic strains were phylogenetically distinct. The new species cluster with a group of organisms that contains the type species of the genus *Flavobacterium*, *Flavobacterium aquatile*. Two new species are described, for which the names *F. gondwanense* and *F. salegens* are proposed; strains ACAM 44 (= DSM 5423) and ACAM 48 (= DSM 5424) are the type strains of *F. gondwanense* and *F. salegens*, respectively. (Auth.)

B-48037

Lunn, N.J., Boyd, I.L., **Effects of maternal age and condition on parturition and the perinatal period of antarctic fur seals**, *Journal of zoology*, Jan. 1993 229(1), p.55-67, 27 refs.

The effect of maternal age and condition on the date of parturition and the duration of the perinatal period of antarctic fur seals at Bird I., South Georgia, were investigated over three consecutive breeding seasons. Females rear young during a four-month lactation period in a highly seasonal but predictable environment. Although females may first pup at three years of age, they did not attain full adult size

until six years of age; older females (over 6 years) tended to be heavier, longer, and in better condition than younger females (3-5 years). Older females returned to breeding beaches earlier and could occupy the most suitable pupping sites, and gave birth when densities of animals on the beaches were low (i.e. more favorable for pup survival). Females that arrived earlier were able to remain ashore longer with their pups prior to departing on their first foraging trips, but this was unrelated to either maternal age or condition. Younger females returned later in the pupping season, possibly as a result of late implantation due to smaller energy reserves than older and larger females. In 1990 all females arrived late, were in poorer condition, gave birth to lighter pups, and had shorter perinatal periods. This suggests that not only was implantation late but that females returned to an area of low food availability prior to parturition. (Auth.)

B-48039

Monod, J.L., Arnaud, P.M., Arnoux, A., **Level of pollution of Kerguelen Islands biota by organochlorine compounds during the seventies**, *Marine pollution bulletin*, Dec. 1992 24(12), p.626-629, 14 refs.

Since 1971 the authors have collected samples for pesticide measurements from birds, fishes and mollusks from the Kerguelen Is. during the Deep-Freeze cruise of the USNS *Eltanin*. During 1975 (cruise MD.04 of MS *Marion Dufresne*) they extended the sampling to some offshore fishes. Accurate measurements done on both sets of samples provided the first comprehensive insight on the level of organochlorine pollutants, including PCBs, for this area. The results are discussed and presented in tables.

B-48050

Ainley, D.G., Ribic, C.A., Fraser, W.R., **Does prey preference affect habitat choice in antarctic seabirds**, *Marine ecology progress series*, Dec. 28, 1992 90(3), p.207-221, Refs. p.220-221.

Diet composition of the members of 2 seabird species assemblages in the Scotia-Weddell Confluence region was investigated during spring 1983, autumn 1986, and winter 1988. One assemblage frequented the pack ice and the other was present in adjacent open waters; most members of the latter species assemblage vacated the Antarctic during winter. To test an *a priori* hypothesis that diet was affected by habitat, diet samples were obtained from birds encountered in 3 habitats: open water, sparse concentrations of ice, and heavy ice cover. Cluster analysis showed broad overlap in seabird diet regardless of species, habitat (ice/water mass) or year. Seabirds exploited prey largely according to ranked availability, although they appeared to choose the larger fish and crustaceans over smaller crustaceans. Myctophids in particular, but also krill and squid, were the main prey groups. Diets did not separate on the basis of predator/prey size to any appreciable degree, even though a 1000-fold difference in predator size existed. Feeding success, as indicated by fullness of stomach of the members of the 2 species assemblages, was highest when in their respective usual habitats. The authors conclude that open-water seabirds lack the specialized foraging behaviors required to exploit the pack-ice environment and that open waters during the winter offer much poorer feeding conditions than those of the pack ice. (Auth. mod.)

B-48052

Deguirmendjian Rosa, C., Rosa, R., Rodrigues, E., Bacila, M., **Blood constituents and electrophoretic patterns in antarctic birds: penguins and skuas**, *Comparative biochemistry and physiology*, Jan. 1993 104A(1), p.117-123, Refs. p.122-123.

A survey was carried out of the blood constituents of penguins from the Pygoscellidae family, *Pygoscellis antartica*, *P. papua* and *P. adeliae*, and of skuas (*Catharacta maccormicki*). Glucose, non-protein nitrogen compounds, proteins, lipids and inorganic compounds

and the electrophoretic patterns for hemoglobin, serum proteins and lipoproteins were studied. The values obtained for glucose partition in the blood, glycosylated hemoglobin and non-protein nitrogen compounds, are discussed. (Auth.)

B-48053

Marchant, H.J., Scott, F.J., **Uptake of sub-micrometre particles and dissolved organic material by antarctic choanoflagellates**, *Marine ecology progress series*, Jan. 26, 1993 92(1-2), p.59-64, 36 refs.

Antarctic choanoflagellates ingest fluorescent latex microspheres over the size range 0.063 to 1.0 micron. They also ingest fluorescently labelled dextrans over the molecular weight range of 4,000-2,000,000 daltons. Calculations based on clearance rates and their abundance indicate that choanoflagellates in antarctic coastal waters clear around 7% of the water column per day. They are likely to be involved in the direct transfer of energy from sub-micrometer particles and high molecular weight dissolved organic material to krill and other grazing invertebrates. (Auth.)

B-48054

Focardi, S., **Mixed function oxidase activity and chlorinated hydrocarbon residues in antarctic sea birds: south polar skua (*Catharacta maccormicki*) and Adélie penguin (*Pygoscelis adeliae*)**, *Marine environmental research*, 1992 34(1-4), p.201-205, 9 refs.

Mixed function oxidase activity (MFO) and chlorinated hydrocarbon residues were studied in the antarctic Adélie penguin and south polar skua, collected on Ross I. The results show striking differences in MFO activities and organochlorines in the two species. Aldrin epoxidase, 7-ethoxyresorufin-O-deethylase (EROD) and cytochrome c reductase activities were very low in penguins, whereas skuas showed activities similar to those reported for certain Northern Hemisphere larids. Organochlorine residue analysis showed polychlorinated biphenyl (PCB) concentrations in liver about five times higher in skuas than in penguins. (Auth.)

B-48055

Cameron Falkner, K., Clark, A.G., **Glutathione S-transferase from an antarctic fish, *Dissostichus mawsoni***, *Marine environmental research*, 1992 34(1-4), p.243-247, 9 refs.

Glutathione S-transferase activity was measured in the hepatic cytosol from *Dissostichus mawsoni* and *Pagothenia borchgrevinkii*. Activity measures with 1-chloro-2,4-dinitrobenzene as substrate were 11.2 and 16.7 micromole/min/g tissue respectively. Little or no activity was detected when *p*-nitrobenzyl chloride or 3,4-dichloro-1-nitrobenzene were used as substrate. The hepatic glutathione S-transferases from *D. mawsoni* were partially purified using gel filtration and chromatofocusing. Three peaks of activity were resolved. The major isozyme (158-fold purification) eluting at pH 7.1 appeared to be catalytically a homodimer. The isozyme was highly inhibited by triphenyltin chloride (IC₅₀=0.1 micromole) while inhibition constants for Cibicron Blue 3GA, bromosulphophthalein and hematin were 1.1, 20 and 34 micromole respectively. (Auth.)

B-48056

Bost, C.A., Clobert, J., **Gentoo penguin *Pygoscelis papua*: factors affecting the process of laying a replacement clutch**, *Acta oecologica*, 1992 13(5), p.593-605, 33 refs.

The Gentoo penguin *Pygoscelis papua* provided a model for the study of factors influencing patterns of re-laying in seabirds during a two-year study in the Crozet Archipelago. The timing of brood loss, the stage of breeding at failure and the degree of reinforcement of the pair bond were found to have interrelated influences. The ability to lay a replacement clutch was more closely associated with mate coordination in foraging trips during the incubation.

The strong capacity to lay replacement clutches was associated with a unique early onset of laying among subantarctic seabirds. The inability to lay a second clutch after a breeding success seems to be related to the important energetic cost of the prolonged chick rearing at the northern edge of the breeding range. (Auth.)

B-48086

Torres N., D., **Marked pinnipeds from different locations sighted in the South Shetland Is.** [Pinnípedos con marcas de distinta procedencia avistados en las islas Shetland del Sur, Antártica], *Boletín antártico chileno*, Mar. 1991 10(2), p.16-19, In Spanish. 6 refs.

A brief review is presented of the process of animal marking and the valuable data—biological, ecological, etc.—that marking provides. A table showing species, type of mark, number, date and precise location of marked-seal sightings in the South Shetland Is. between 1985 and 1988 is presented and commented upon. Also included is a table listing countries with marking programs and the species with which they deal.

B-48088

Kock, K.H., **Antarctic fish and fisheries**, Cambridge, University Press, 1992, 359p., Refs. p.301-343.

DLC SH320.5.K63

Although antarctic finfish have been exploited for more than two decades and many stocks now appear to be overfished, this is the first detailed account of this fishery. The book begins by giving a comprehensive description of antarctic fish biology and ecology, a thorough understanding of which is a prerequisite to sound management of the fishery. Subsequent sections consider the course of finfish exploitation and the present status of exploited fish stocks in the southern ocean. The author concludes by proposing more effective management methods for the fish resources of the southern ocean in light of the Convention on the Conservation of Antarctic Marine Living Resources. (Auth.)

B-48093

Montgomery, J.C., Coombs, S., **Physiological characterization of lateral line function in the antarctic fish *Trematomus bernacchii***, *Brain, behavior and evolution*, Nov. 1992 40(5), p.209-216, 24 refs.

The antarctic notothenioids are a monophyletic radiation of fishes that have evolved under conditions of low light and cold, where non-visual sensory systems, such as the mechanosensory lateral line system, would be of importance. As part of a study of the structure and function of the mechanosensory lateral line system in these fishes, the authors systematically characterized the function of the anterior lateral line system in one of the common benthic species, *Trematomus bernacchii*. Frequency response and threshold-tuning curve methods yield similar functional characterizations of single afferent fiber responses to vibrational stimulation. Curve fitting of generalized transfer function to frequency response curves allows an objective splitting of responses into velocity and acceleration sensitive populations thought to correspond to superficial and canal neuromasts, respectively. Both response types are characterized by a low-pass frequency response curve, with a relatively low upper frequency cut-off when compared with data from temperate species. The sensitivity of the lateral line system of *T. bernacchii* is comparable to that of the mottled sculpin *Cottus bairdi*. (Auth.)

B-48094

Coombs, S., Montgomery, J.C., **Fibers innervating different parts of the lateral line system of an antarctic notothenioid, *Trematomus bernacchii*, have similar frequency responses, despite large variation in the peripheral morphology**, *Brain, behavior and evolution*, Nov. 1992 40(5), p.217-233, 41 refs.

Regional differences in the architecture and size of lateral line canals and neuromasts were measured in an antarctic fish, *Trematomus bernacchii*, and the data were used in models of canal and cupular mechanics to predict the frequency response of these two peripheral response functions measured with single unit recording techniques from anterior and posterior lateral line fibers innervating different canals on the head and trunk of fish of various sizes. In response to stimuli of equal pk-pk acceleration levels, all canal neuromast fibers responded with equal and maximum responsiveness in the 10-45 Hz range, after which responsiveness fell off at about 18 dB/octave. These models predicted responsiveness out to at least 540 Hz, and a high frequency slope of 12 dB/octave. In terms of the frequency response of peripheral fibers, it is concluded that (1) there can be considerable morphological variability, with little consequence for function, as long as some minimum standards for maintaining constant acceleration responsiveness in the 10-45 Hz range are met, and (2) there must be additional filters between the cupula and primary afferent fibers.

B-48098

Gutt, J., **Are Weddell Sea holothurians typical representatives of the antarctic benthos? A comparative study with new results**, *Meeresforschung*, Dec. 1991 33(4), p.312-329, With German and Spanish summaries. Refs. p.326-329.

The holothurian fauna of the Weddell Sea is compared with general statements about the antarctic benthos with respect to eleven biological parameters: 1. biomass, 2. living type (motile/sessile), 3. feeding type, 4. species richness, 5. individual size, 6. taxonomic representation, 7. endemism, 8. deep-sea affinity, 9. bathymetric distribution, 10. phylogenetic age, 11. biological accommodation. In nine characteristics Weddell Sea holothurians correspond fairly well with other groups, and only differ from the general characteristics of antarctic benthos in terms of great species richness and a reduced number of higher taxa. Therefore they can be considered as typical representatives of the antarctic benthos with some specific characteristics.

B-48118

Cheng, X.H., Wang, Y.H., Xia, W.P., Chang, H.S., **Research on the benthic ecology environment, antarctic ocean: 1. Maxwell Bay and Admiralty Bay**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.38-45, In Chinese with English summary. 14 refs.

Data on benthic organisms and the geochemical environment of Maxwell and Admiralty bays show that benthic organisms grow well when the bottom water is rich in dissolved oxygen and oxidation is poor in surface sediments, with manganese oxides as dominant oxidant. In the low temperatures of the Antarctic, the solubility of carbonates is higher than that in other oceans, but the concentration of calcium in the overlying water and porewater is not, which may make it difficult for crustaceans and mollusks to obtain sufficient calcium to form their shells. A relationship between the amount of sedentary polychaetes and water temperatures is found, suggesting that the animals had not adjusted to the extremely cold antarctic waters.

B-48120

Li, X.D., **Observation and study on the microclimate of the moss vegetation in the King George Island**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.52-57, In Chinese with English summary. 4 refs.

Results of weather observations in relation to the growth of mosses in the vicinity of the Great Wall Station, carried out during Feb. 1 to 10, 1989, are discussed. Tables showing diurnal temperature variations, and the vertical distribution of temperature and relative humidity, are presented.

B-48123

Lizotte, M.P., Priscu, J.C., **Spectral irradiance and bio-optical properties in perennially ice-covered lakes of the dry valleys (McMurdo Sound, Antarctica)**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.1-14, 38 refs.

Lakes of the dry valley region near McMurdo Sound which are perennially ice-covered (approximately 4 m thick) and contain only microorganisms in the plankton were studied. Profiles of the flux and spectral distribution of photosynthetically available radiation (400-700 nm) and the optical properties of suspended particulate material were measured for Lake Bonney and Lake Fryxell. The spectral quality of light immediately beneath the ice was similar in both lakes; irradiance was always less than 50 micromol photons/sq m/s. However, the concentration and vertical distribution of phytoplankton biomass (i.e., chlorophyll) differed greatly among the three lakes, and was similar to the trend in light attenuation of Lake Fryxell > Lake Hoare > Lake Bonney. The same relationship between chlorophyll and light attenuation was observed as chlorophyll concentrations increased over the growth season in Lake Bonney. An analysis of absorption due to water, phytoplankton, detritus and, by difference, gilvin (dissolved materials) showed that water was the dominant absorber (38-75% of the total absorption coefficient) but that phytoplankton was usually the most important of the variable components (11-47%). In terms of the relative importance of light-absorbing components, the dry valley lakes appear to be most similar to oligotrophic seas and would be defined as case 1 waters. (Auth. mod.)

B-48130

Pakhomov, E.A., Shumatova, A.A., **Feeding and estimation of daily ration of Wilson's glassfish, *Chaenodraco wilsoni*, of the Indian Ocean sector of Antarctica**, *Journal of ichthyology*, 1992 32(7), p.56-70, Translated from Voprosy ikhtiologii 32(2):129-140, 1992. 24 refs.

Wilson's glassfish is a typical macroplanktivore, feeding mainly on euphausiids, chiefly antarctic krill. Size-related, geographic, and between-years variations in feeding are shown. The values of daily and annual rations may be used to estimate the amount of krill consumed. Wilson's glassfish is an abundant and widely distributed species on the shelf and continental slope of Antarctica, but little is known of its biology. Only fragmentary data on feeding of young and adult individuals can be found in the literature. In the present work, various aspects of the feeding of Wilson's glassfish are examined on the basis of extensive original material, and their daily rations is estimated. (Auth. mod.)

B-48131

Chesheva, Z.A., **Data on the biology of the Magellan hake, *Macrurus magellanicus*, from the southwestern Atlantic**, *Journal of ichthyology*, 1992 32(7), p.137-141, Translated from Voprosy ikhtiologii 32(3):162-165, 1992. 9 refs.

Fishing was done off the Argentinian coast between 50 and 64S latitude. Information is provided on fishing methods, populations of the Magellan hake, male to female ratio and sizes, and seasonal differences and densities.

B-48146

Wania, F., Mackay, D., **Global fractionation and cold condensation of low volatility organochlorine compounds in polar regions**, *Ambio*, Feb. 1993 22(1), p.10-18, 71 refs.

Organochlorine chemicals, including chlorinated pesticides and polychlorobiphenyls, are found at appreciable concentrations in the polar regions, presumably as a result of long-range atmospheric transport. Concentration data in arctic and antarctic air, snow, atmospheric deposition, fish and seals, measured by various investigators, are compiled and interpreted to determine latitudinal and temporal trends. It is suggested that the often surprisingly high concentrations are explained in part by the temperature-dependent partitioning of these low volatility compounds. A process of global fractionation may be occurring in which organic compounds become latitudinally fractionated, "condensing" at different ambient temperatures dependent on their volatility. It is suggested that compounds with vapor pressures in a certain low range may preferentially accumulate in polar regions. (Auth. mod.)

B-48151

Zernova, V.V., **Seasonal variations in the vertical distribution of phytoplankton in the southern ocean**, *Oceanology*, 1992(Pub. Aug. 92) 32(1), p.66-70, Translated from Okeanologiya. 14 refs.

Variations in the vertical structure of the phytocenosis of antarctic and subantarctic waters during the growth period are discussed, based on 20 meridional transects on which phytoplankton was collected. Although the subantarctic phytoplankton has a relatively uniform distribution in spring, slight maxima of abundance most often occur at the surface and at a depth of 25 m; the maximum values occur at depths of 10 and 75 m in summer, and 10 and 50 m in autumn. In subantarctic waters, the thickness of the trophic layer (75 or 100 m) persists throughout the growth period, but in antarctic waters this distribution occurs only in spring and autumn, when the surface waters are well mixed. In summer, with the onset of stratification, the thickness of this layer decreases to 0-50 m. (Auth.)

B-48152

Kosobokova, K.N., **Experimental study of the fecundity of the antarctic copepod *Calanus propinquus***, *Oceanology*, 1992(Pub. Aug. 92) 32(1), p.89-93, Translated from Okeanologiya. 15 refs.

The first experimental data on the fecundity of the copepod *Calanus propinquus* are reported. The investigations were made in the Atlantic sector of the Antarctic in Feb.-Apr. 1989. Females kept in the laboratory at 0 C produced batches of eggs once every 2 to 3 days; the average interval between batches was 3.2 days. The most frequent batch size was 10-40 eggs, the mean size was 37.3 eggs, and the largest size was 157 eggs. The length of spawning ranged from 5 to 53 days. The average organic carbon content of an egg was 0.37 mg. The mean diurnal production over the entire spawning period was 17 eggs per female per day, or 1.4% of body organic carbon. The greatest total production was 719 eggs over 53 days, equivalent to 57.8% of body organic carbon. The spawning of *C. propinquus* in the area studied appears to begin in Sep. and to last 1.5-3 months. (Auth.)

B-48153

Rubinshtein, I.G., **Some characteristics of the distribution of bottom fauna on the northern Kerguelen ridge**, *Oceanology*, 1991(Pub. June 92) 31(6), p.729-732, Translated from Okeanologiya. 10 refs.

In the benthic zone of the northern Kerguelen ridge, the biomass of bottom organisms is smaller by a factor of 1.6-14.5 than at corresponding depths on the shelf of Antarctica. In contrast to the antarctic waters, sedentary forms are dominant at all depths in the region studied. The abundance of attached organisms (sponges, bryozoans, and ascidians) is very low. The key factor in this unusual distribution of bottom fauna is the accumulation of unconsolidated biogenic deposits in the shelf zones of the islands during the postglacial period. The biomass distribution of bottom organisms is correlated with the concentration of readily available organic matter in the surface layer of the sediments. The abundance and trophic makeup of the macrobenthos depend on the rate of deposition of the organic matter needed as food and on its rate of decomposition in the sediments. (Auth.)

B-48155

Boyd, I.L., Roberts, J.P., **Tooth growth in male antarctic fur seals (*Arctocephalus gazella*) from South Georgia: an indicator of long-term growth history**, *Journal of zoology*, Feb. 1993 229(2), p.177-190, 28 refs.

Growth of upper canine teeth of male antarctic fur seals (*Arctocephalus gazella*) which died of natural causes at Bird I. was quantified from measurements of annual layers in longitudinal sections of teeth. Mean age at death was 7.69 years, and this showed a small but significant increase through the period when samples were collected (1972/73-1988/89). There were significant correlations between morphometrics of teeth and those of seals, suggesting that tooth growth provided an indication of body growth. Tooth growth rate was lowest in seals which died early (age 4 years) and increased with age at death. Changes in the growth pattern of teeth suggested that fur seals which became sexually mature early also died early. No trends in cohort strengths were detected, but particularly poor years for growth were closely related to years in which reproductive performance was also observed to be low. Variations in growth from 1967/68 to 1987/88 were correlated significantly ($P < 0.008$) with the Southern Oscillation Index of climatic variation. (Auth. mod.)

B-48163

Lee, J.S., **Vegetational distribution of lichens in Barton Peninsula, King George Island, Antarctica**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.27-34, In Korean with English summary. 21 refs.

Summed dominance ratio (SDR) and vegetational coverage of lichens were measured at 45 observation points of mountainous areas, and the frequency distribution was measured at 14 observation points of various coastal exposed rocks on Barton Peninsula. In total, 43 species of lichens belonging to 34 genera were found. Species diversity increased up to 100 m altitude, then decreased above 100 m altitude. The species diversity was highest in 25-100 m altitudinal ranges. Macro-lichens *Usnea fasciata*, *Himantormia lugubris*, *Sphaerophorus globosus* and *Stereocaulon alpinum* were distributed in all altitudinal ranges of mountainous areas. High summed dominance ratios of the *U. fasciata*-*H. lugubris* association were obtained in all altitudinal ranges of mountainous areas on the Peninsula. The mean value of vegetational coverages in altitudinal ranges of mountainous areas were 43.2%, ranging from 32.1 to 50.2%. On coastal exposed rocks, fruticose, foliose and crustose lichens were distributed; the ornithocoprophilous lichens were dominant. The species diversity was highest near the penguin colony. (Auth.)

B-48171

Jeong, H.C., **Observations of seals around King Sejong Station during 1989 austral winter**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.123-124, In Korean.

A short note in Korean is presented with a table showing the number of seal species sighted, and wind speed and air temperatures recorded, in the vicinity of King Sejong Station between Jan. 1 and Sep. 9, 1989.

B-48173

Bernhard, J.M., **Experimental and field evidence of antarctic foraminiferal tolerance to anoxia and hydrogen sulfide**, *Marine micropaleontology*, Jan. 1993 20(3/4), p.203-213, 47 refs.

The common occurrence of foraminifera in strata deposited under anoxic environmental conditions throughout the geologic record raises the question of whether foraminifera actually survive anoxic or reducing conditions. To test this, benthic foraminifera from McMurdo Sound were exposed to anoxic or reducing conditions for 30 days. These antarctic forms are known to be exposed to anoxic events in their natural environment. An adenosine triphosphate (ATP) assay was used to determine foraminiferal survival, and their ultrastructure was examined using transmission electron microscopy (TEM) to evaluate any possible effect that might have resulted from exposure to anoxic or reducing conditions. Some ultrastructural evidence for encystment (fibrillar membrane-bound bodies in the cytoplasm of many specimens) was observed. Field data include the observation that *Globocassidulina* cf. *G. bitor* resides in sediments to depths of 7 cm, as evidenced by ultrastructural investigations. A specimen of *Globocassidulina* cf. *G. bitor* collected from sediments containing anoxic pore waters showed numerous bacteria within the confines of the organic lining. The occurrence of cytoplasmic inclusions similar in appearance to carboxysomes within these bacteria suggests possible affinities to the chemolithotrophic *Thiobacillus*. Bacteria of this type were not observed in specimens collected from oxygenated pore waters. These field and laboratory findings suggest that certain foraminifera may be facultative anaerobes able to withstand reducing conditions. (Auth. mod.)

B-48174

Wöhrmann, A.P.A., **Freezing resistance in antarctic and arctic fishes** [Gefrierschutz bei Fischen der Polarmeere], *Berichte zur Polarforschung*, 1993 No.119, 99p., In German with English summary. Refs. p.87-99.

In the blood of many antarctic notothenioids, freezing is inhibited by antifreeze glycoprotein macromolecules (AFGP). These antifreeze molecules are built up of repeating tripeptide units to which a disaccharide is linked through the hydroxyl oxygen of the threonyl residue. Samples were taken during two antarctic expeditions in the Weddell Sea and the Lazarev Sea and one arctic expedition in the Greenland Sea. Two hundred and twenty-nine fishes of 5 orders (36 species) were investigated for antifreeze macromolecules, which were extracted from both whole fish and specific tissues and were isolated with various types of liquid chromatography. The isolation and characterization of the PAGP has shown that AFGP is not the only glycoprotein which produces a thermal hysteric effect. The mechanism of the freezing point depression shows a new way for protection against freezing. Antifreeze macromolecules were isolated from all teleosts investigated here, but species which live in warmer water have also been found to contain antifreeze proteins. There is, however, a correlation between the AFGP concentration and the mode of life of the species. Fish living in ice-laden water contain much more AFGP than species living in warmer and/or deeper water. Antifreeze molecules are found throughout the phylogenetic tree of fish even between highly dissimilar taxa. The conclusion drawn is that before the continental drift occurred, a precursor protein to the present antifreeze proteins existed, which has evolved into the various antifreeze proteins found today. (Auth. mod.)

B-48178

Young, G.C., Long, J.A., Ritchie, A., **Crossopterygian fishes from the Devonian of Antarctica: systematics, relationships and biogeographic significance**, Records of the Australian Museum. Supplement 14, Sydney South, NSW, Australia, Australian Museum, 1992, 77p., Refs. p.70-74.

DLC QE852.C7Y68 1992

Four new genera of osteolepiforms and a new rhizodontiform genus are described from the Middle-Late Devonian Aztec Siltstone (Beacon Supergroup) of Antarctica. Other indeterminate osteolepid, eusthenopterid and rhizodontid remains, and a single indeterminate porolepiform scale, are described from the same formation. The stratigraphic distribution of rhipidistians in the Aztec Siltstone is summarized, and the biogeography and phylogenetic relationships of the new taxa discussed. The canowindrids were an endemic group of East Gondwana. The megalichthyids and rhizodontiforms may have originated in the East Gondwana Province during the Middle Devonian, but did not reach Euramerica until the uppermost Late Devonian. They flourished in the Carboniferous Period following the decline of the eusthenopterids and the initial radiation of tetrapods. (Auth. mod.)

B-48197

Greenfield, L.G., **Decomposition studies on New Zealand and antarctic lichens**, *Lichenologist*, 1993 25(1), p.73-82, 20 refs.

The decomposition of ground, dead (oven-dried) lichens has been studied in laboratory experiments that aimed to simulate decomposition in nature. Enzymes, common in soil animal guts and soil microbes, solubilized 29% of the lichen weight and 25% of lichen nitrogen. Approximately 9% of lichen nitrogen was mobilized to mineral forms during 97 days of incubation in soil or sand. Low moisture levels reduced the amount of nitrogen mobilized. In short-term (30 days) incubation studies, lichens at optimum moisture but low temperature lost 9% of their initial dry weight due to microbial metabolism. In contrast, lichens incubated for 30 and 135 days at similar moisture levels but higher temperatures lost 19% and 30% respectively of their initial dry weight due to microbial metabolism. (Auth.)

B-48203

Franzmann, P.D., **Methanogenic archaeon from Ace Lake, Antarctica: *Methanococcoides burtonii* sp. nov.**, *Systematic and applied microbiology*, Dec. 1992 15(4), p.573-581, Refs. p.580-581.

A methylotrophic, methanogenic bacterium was isolated from the anoxic hypolimnion of Ace Lake, a lake with ionic composition similar to that of seawater. The new isolate utilized methanol in addition to methylamines but not H₂:CO₂, formate or acetate. The optimum and maximum temperatures for growth were 23.4 and 29.5 °C respectively. The strain grew in artificial media at *in situ* lake temperature (1.7 °C), provided growth was first initiated in the media at higher temperatures. The strain had a theoretical minimum temperature for growth of -2.5 °C. The mol% G+C content of DNA from the strain was 39.6% (Tm). The phenotype, polar lipid pattern, antigenic fingerprint and 16S rRNA sequence of the strain were most similar to, but distinct from *Methanococcoides methylutens*. DNA/DNA homology was low between the Ace Lake methanogen and *M. methylutens* (27.5%). A new species *M. burtonii* is described with type strain DSM 6242. (Auth.)

B-48204

Roser, D.J., Seppelt, R.D., Ashbolt, N.J., **Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: microbial biomass distribution**, *Soil biology and biochemistry*, Feb. 1993 25(2), p.165-175, Refs. p.173-175.

The microbial biomass present in Windmill Is. soils, under varying degrees of Adélie penguin influence, was estimated using 4 different approaches. Average concentrations of 1200, 180, and 440 microgram microbial C/g (measured as ATP) were detected in active colonies, extinct colonies and soils possessing visible algal growth, respectively. This compared with an average of 12 microgram C/g in control samples from sites remote from penguin colonies. Biomass estimates based on substrate-induced respiration rates were 1-4 times

higher than the equivalent ATP estimates. The soil microbiota of active penguin colonies was dominated by bacteria (92% of the total biomass) with tetrad-forming cocci comprising 35% of the total biovolume. Away from the immediate colony site, algal biomass, measured as chlorophyll *a*, accounted for 78-96% of the total biomass of carbon, while bacterial biomass measured microscopically accounted for 4-22%. Yeasts accounted for <1% of the total biomass. Too few fungal hyphae were detected to make useful direct counts, and their biomass appeared to be less than for yeast-like forms. Increasing algal predominance corresponded with decreasing soil pH and a 10,000-fold increase in fungal biomass compared to bacterial microbiota, as measured by colony counts. (Auth.)

B-48205

Roser, D.J., Seppelt, R.D., Ashbolt, N.J., **Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: some observations on methods for measuring soil biomass in ornithogenic soils**, *Soil biology and biochemistry*, Feb. 1993 25(2), p.177-183, Refs. p.182-183.

A range of measures of microbial biomass were compared for their effectiveness and internal consistency in characterizing ornithogenic soils. Excellent correspondences were found between 4 measures of total biomass (ATP, fluorescein diacetate hydrolysis rate, substrate induced respiration rate and algal + bacterial biomass) when they were compared using regression analysis. Bacterial numbers, estimated from agar plate counts, were found to be highly correlated with microscopy counts and total biomass measurements, though the best-fit relationship was curvilinear rather than linear. Measurement of the procaryotic and eucaryotic components of the soil microbiota by selective antibiotic inhibition was found to be unreliable. Other problems were noted when assay units were converted into microbial C using multiplication factors published in the literature. The substrate-induced respiration method overestimated the bacterial biomass of occupied penguin colony soil by at least 4-fold when a standard conversion factor was used. Total biomass was also overestimated when fluorescein-diacetate-hydrolysis rates were converted to microbial C. While all 4 approaches could provide relative measures of the biomass of the antarctic microbiota, it was concluded that they should not be employed in isolation but always in parallel when such soils are initially analyzed. (Auth.)

B-48206

Neale, P.J., Priscu, J.C., **Variation of the fluorescence quantum yield in relation to photosynthesis by phytoplankton from perennially ice-covered Lake Bonney**, *Antarctic journal of the United States*, 1991 26(5), p.228-230, 6 refs.

The authors present preliminary results on the variation of fluorescence yield of Lake Bonney phytoplankton *in vitro* and discuss approaches used to estimate primary productivity from natural fluorescence. *In situ* measurements of natural fluorescence and other bio-optical parameters are presented in a separate contribution. Preliminary results suggest that both the original and modified method for the estimation of photosynthesis from natural fluorescence shows significantly slower saturation with increasing light intensity compared to the carbon-14 derived curve. On the other hand, the fluorescence ratio method shows a closer correspondence to the saturation characteristics of carbon-14 assimilation.

B-48207

Harnish, R.A., Ranville, J.F., McKnight, D.M., Spaulding, S.A., **Redox-mediated cycling of iron and manganese in Lake Fryxell: associations with particulate, colloidal, and dissolved forms**, *Antarctic journal of the United States*, 1991 26(5), p.230-232, 10 refs.

During the summer of 1990-1991, the authors sampled lake water column profiles of particulate, colloidal, and dissolved metal species by tangential-flow ultrafiltration, with particular emphasis on iron-size fractionation. Considerable evidence has accumulated to indicate the importance of particulate and colloidal phases (organic and inorganic) in the cycling and transport of iron. The iron profile presented here suggests a complex dynamic for iron cycling involving the superposition of biotic transformations of iron species and forms, abiotic redox mediation, equilibrium solubility control, and particulate/colloidal/dissolved form transformations. The complexity of these cycles and apparent superposition of chemical, hydrologic, and biotic processes emphasize that although simple conceptual models aid in understanding the cycling of redox elements, more rigorous treatment is required.

B-48208

Freckman, D.W., Virginia, R.A., **Nematodes in the McMurdo Dry Valleys of southern Victoria Land**, *Antarctic journal of the United States*, 1991 26(5), p.233-234, 2 refs.

The ecology and functional significance of nematodes in the antarctic polar desert were studied. During 1990-1991, the authors sought to examine the distribution of nematodes and their relationship to soil microbial and soil physical and chemical factors in the McMurdo Dry Valleys and to determine the response of soil nematodes to temperature, moisture, and carbon augmentation in a 1-year field experiment. More than 65% of McMurdo Dry Valley soils contained nematodes. The distribution of soil nematodes was more patchy than in other desert soils; however, where nematodes occurred, the densities in the McMurdo Dry Valleys (up to 4,000/kg dry soil) were comparable to nematode densities in other desert soils. Nematodes occurred in greater abundance in dry soils than did rotifers and tardigrades, which were generally restricted to moist soils near melt-streams. The diversity (three genera) and trophic structure of the nematode community in McMurdo Dry Valley soils is less complex than in other deserts. In McMurdo Dry Valley soils, nematodes occupy two or three functional levels, bacterial-feeding (*Scottinema lindsayae*, Plectus sp.) and omnivore/predaceous (*Eudorylaimus* sp.).

B-48231

Kopczyńska, E., **Distribution of microflagellates and diatoms in the sea-ice zone between Elephant Island and the South Orkney Islands (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.515-528, With Polish summary. 28 refs.

The highest concentrations of algal cells and of algal carbon were associated with a lens of ice melt water in the northeast of the study area. Phytoflagellates were dominant at all stations, with greater numbers always in the 0-20 m surface layer and with the peaks of Cryptophyceae in the open waters and also near the ice edge east of 50W. Picoplankton flagellates and monads were generally next in abundance and most important numerically in the near-ice stations in the western part of the study area. Parasinophyceae were usually more abundant than *Nitzschia cylindrus* (Grunow) Hasle, the only common diatom species found mainly in the western stations near ice edge. The presence of *N. cylindrus*, dominant in the pack ice and in phytoplankton near the ice edge, shows that algae released from ice may act as an inoculum for the phytoplankton. (Auth.)

B-48232

Ligowski, R., Kopczyńska, E., **Distribution of net phytoplankton in the sea-ice zone between Elephant Island and the South Orkney Islands (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.529-546, With Polish summary. Refs. p.543-546.

Altogether 105 algal taxa were identified including 101 diatom species. *Chaetoceros criophilus* was dominant in the western part of

the study area influenced by waters from the Bellingshausen Sea. *Corethron criophilum* was abundant in the Weddell Sea water mass east of 53.5W. *Nitzschia cylindrus*, common in the ice-melt samples, was dominant in only two net phytoplankton collections obtained at the ice-edge zone. Additional samples from Admiralty Bay, King George I. revealed the dominance of *Chaetoceros socialis* and the presence of many tychoplankton species. Very few diatom cells were found in the open waters of the Bransfield Strait which, combined with the presence of krill, suggested intensive grazing by herbivores. The unstable waters of the Weddell-Scotia Confluence area contained little phytoplankton except for a station dominated by *Phaeocystis pouchetii*. Greater cell densities were related to warm, lower salinity Weddell Sea water of summer modification found in the surface layer east from 49W. (Auth.)

B-48233

Ligowski, R., **Sea ice microalgae at the northern boundary of the pack ice between Elephant Island and South Orkney Islands (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.547-563, With Polish summary. Refs. p.561-563.

At the northern border of pack ice a study on chlorophyll *a* content, density of cells, species composition and domination in samples from the drifting ice floes and from brash ice was carried out. 102 taxa of algae were found in the pack ice. In the study area algal taxa were rather uniformly distributed. In different ice layers the qualitative composition of diatom assemblages was similar and usually the diatom *Nitzschia cylindrus* was dominant and most frequent. Chlorophyll *a* content and the density of cells varied strongly in various habitats. Ice floes near the northern pack ice border contained low levels of chlorophyll *a*. However, brash sea ice originating from ice floes averaged 142.4 mg/cu m of chlorophyll *a* in visibly discolored and 30.1 mg/cu m of chlorophyll *a* in not visibly discolored parts. The range of chlorophyll *a* content and the presence of characteristic species aided in the identification of brash ice infiltration assemblage of diatoms. (Auth. mod.)

B-48234

Siciński, J., Kittel, W., Zmijewska, M.I., **Macrozooplankton near the pack ice between Elephant Island and the South Orkney Islands (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.565-582, With Polish summary. 36 refs.

Macrozooplankton were caught at 17 stations with a Bongo net from the 0-200 m layer. The stations were located near the pack ice edge between Elephant I. and the South Orkney Is. The cluster analysis of 58 recognized taxa provided the means to distinguish 3 regions: the western—near Elephant I., the middle and the eastern—at the South Orkney Is. No clear difference in macrozooplankton species composition at the open sea stations and those near pack ice was found. The average biomass of macrozooplankton in the investigated area amounted to 82.8 g/1000 cu m. Macrozooplankton was dominated by salps and krill. The biomass were 52.0 g/1000 cu m and 26.1 g/1000 cu m, respectively. Differences in the biomass distribution of some taxa in three distinguished regions were observed. Except for salps, the biomass of particular taxa caught near the pack ice edge and the same taxa caught in stations distant from this edge were similar. The biomass of salps was evidently higher in most northern stations. (Auth.)

B-48235

Godlewska, M., Klusek, Z., **Krill migration at the ice edge zone (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.583-592, With Polish summary. 27 refs.

At the ice edge krill undergoes diurnal migrations with the period of 12 hours and amplitude of about 6 m. The mean depth of krill oc-

currence is 41 m, shallower then for open waters. These migration parameters are characteristic of juvenile adolescent krill dominating at the ice edge. (Auth.)

B-48236

Godlewska, M., Klusek, Z., Kamionka, L., **Distribution and abundance of krill *Euphausia superba* Dana at the ice edge zone between Elephant Island and the South Orkney Islands**, *Polish polar research*, 1991 12(4), p.593-603, With Polish summary. 26 refs.

In the investigated area the overall abundance of krill was small and was increasing with distance from the ice. However, with the data available it was not possible to decide whether this increase was related to the ice border or was part of a larger-scale phenomenon. The depth distributions as well as the mean values of krill depth were similar to those of open water both in this study and as reported in the literature. (Auth.)

B-48237

Skóra, K.E., **Ichthyoplankton near ice edge between King George Island and the South Orkney Islands**, *Polish polar research*, 1991 12(4), p.605-611, With Polish summary. 10 refs.

In the region between King George I. and the South Orkney Is. 7 fish species from 6 families were found. The concentration of larvae at the edge of drifting ice was higher, 2550 ind/cu m, than in the stations situated at a distance from the ice edge, 930 ind/cu m. (Auth.)

B-48238

Williams, T.D., Ghebremeskel, K., Williams, G., Crawford, M.A., **Breeding and moulting fasts in macaroni penguins: do birds exhaust their fat reserves**, *Comparative biochemistry and physiology*, Dec. 1992 103A(4), p.783-785, 20 refs.

Plasma concentrations of urea, uric acid and total lipid were compared in pre- and late-fast breeding and moulting macaroni penguins to test the hypothesis that birds exhaust their lipid reserves and initiate marked protein utilization towards the end of natural fasts. Male and female macaroni penguins fasted for a minimum of 29-32 days and 20 days during the breeding and moult fasts, and the difference in body weight over the sample period (reflecting body weight loss) was 31-34% and 41-47%, respectively. There was no significant increase in plasma urea or uric acid at the end of either fast, nor any decrease in plasma lipid concentrations compared to pre-fast birds. These results suggest that macaroni penguins continue to rely mainly on lipid reserves during the later stages of natural fasts. This is consistent with post-fast body composition data for other small penguin species. (Auth.)

B-48240

Miller, G.D., Davis, L.S., **Foraging flexibility of Adélie penguins *Pygoscelis adeliae*: consequences for an indicator species**, *Biological conservation*, 1993 63(3), p.223-230, 29 refs.

Because Adélie penguins feed almost exclusively on krill, the duration of their foraging trips has been suggested as an index of krill abundance. Three experiments were performed to test factors that affect foraging trip durations during the incubation stage. In the first two experiments, the time that the adults fasted before the female left on the first foraging trip was increased. In the last experiment real or mock instrument packages were attached to their backs to create additional drag. Time spent fasting before foraging did not affect foraging trip duration. Penguins with instruments attached to their backs did, however, forage significantly longer than control birds.

The necessity to relieve their mates on the nest limits foraging adults to a particular schedule during the incubation stage. The penguins can cope with substantial delays and difficulty foraging in order to return to their nests before their mates desert. Consequently, the duration of foraging trips during the incubation phase is not a sensitive index of foraging conditions (i.e. krill abundance), and its potential can only be realized in combination with several other factors. (Auth.)

B-48243

Burgess, J.S., Spate, A.P., Norman, F.I., **Environmental impacts of station development in the Larsemann Hills, Princess Elizabeth Land, Antarctica**, *Journal of environmental management*, Dec. 1992 36(4), p.287-299, 16 refs.

The Larsemann Hills has been the site for large winter bases built by the People's Republic of China and U.S.S.R. and a small summer base built by Australia. The three bases are located within 3 km of one another. Station development has only occurred since 1986 and consequently environmental changes have been very sudden. Associated with station development has been the establishment of a road network on one peninsula. Visitors to the area have risen in number from 71 in 1987 to a conservative estimate of 445 in 1991. The increased number of human visitors has resulted in rubbish and other evidence of visitation being observed over almost 10 sq km. This paper attempts to outline environmental impacts observed by the authors since 1986. (Auth.)

B-48244

Bester, M.N., Pansegrouw, H.M., **Ranging behaviour of southern elephant seal cows from Marion Island, South African journal of science**, Nov./Dec. 1992 88(11/12), p.574-575, 13 refs.

Southern elephant seals, *Mirounga leonina*, comprising the South Georgia, Macquarie and Kerguelen stocks, breed and moult on islands on both sides of the Antarctic Polar Front (APF). In the Kerguelen Province the subpopulations of *M. leonina* hauling out at Heard I., Îles Kerguelen, Marion I. and Île de la Possession are declining, and terrestrial studies have failed to explain the reason(s) for the declines. As the fall in the southern elephant seal population at Marion I. appears to be influenced by factors affecting the survival of immature and young adult cows which feed only while at sea, investigating the pelagic phase of their life cycle is the most important priority. The present study shows that adult cows range widely and appear to concentrate their feeding at oceanic frontal systems. (Auth.)

B-48246

Ryan, P.G., Steele, W.K., Siegfried, W.R., Vogel, J.C., **Radiocarbon dates of snow petrel regurgitations can reveal exposure periods for nunataks in Antarctica**, *South African journal of science*, Nov./Dec. 1992 88(11/12), p.578-580, 22 refs.

Many petrels regurgitate proventricular oil as a means of defense against potential predators, such as skuas. Microbial activity is reduced at nunataks because of low ambient temperatures, allowing these proventricular oils to accumulate. Deposits of proventricular oil, mixed with some guano, are known as 'mumiyo' after similar-looking deposits found in the mountains of central Asia. Antarctic mumiyo generally has a stratified internal structure and sometimes occurs as large accumulations of several kilograms. This provides an opportunity to use radiocarbon dating techniques to estimate the length of occupation of nunataks by petrel breeding colonies. Samples of mumiyo and guano from a few sites in Antarctica have previously been radiocarbon dated. If occupation by breeding seabirds is an important preliminary stage in the colonization of nunataks by some plant and invertebrate species, knowing the length of time a bird colony has

been established should be of great value in studies on the colonization of nunataks by floral and faunal elements. (Auth.)

B-48250

Linskens, H.F., Bargagli, R., Cresti, M., Focardi, S., **Entrapment of long-distance transported pollen grains by various moss species in coastal Victoria Land, Antarctica**, *Polar biology*, 1993 13(2), p.81-87, 36 refs.

In northern Victoria Land, 18 moss samples have been collected and analyzed for the presence of pollen. In turfs and cushions of 8 different moss species, at least 27 pollen taxa could be identified. The *Pinus*-type pollen and those of grasses were very common. More than 60% of the total grains were damaged or could not be identified. There is evidence that the antarctic continent could act as a sink for wind-transported pollen from subantarctic islands, or from plants (native or cultivated) in South America, Australia, New Zealand and South Africa. However, the pollen concentration in the air (<1 pollen grain/100 cu m) and its entrapment rate on moss (about 0.12 grain/sq cm/year) result in a very low pollen density in these plants. (Auth.)

B-48251

Brey, T., Starmans, A., Magiera, U., Hain, S., ***Lissarca notorcadensis* (Bivalvia: Phylobryidae) living on *Notocidaris* sp. (Echinoidea: Cidaridae): population dynamics in limited space**, *Polar biology*, 1993 13(2), p.89-95, 24 refs.

Population dynamics of the epizoic bivalve *Lissarca notorcadensis* living on spines of cidaroid sea urchins in the Weddell Sea were investigated. Total production (somatic & gonad) of the suspension feeding bivalve ranged between 16.5 and 487.4 mg AFDM/y per sea urchin. Annual sedimentation rates are not sufficient to maintain the production of the *Lissarca* sub-populations carried by the sea urchins, and resuspension of organic matter is most likely to be an important food source. The ratio of the number of freshly settled juveniles to the number of embryos brooded is between 0.054 and 0.207 and seems negatively related to the biomass already present, indicating intraspecific competition for space. Interspecific competition for space is caused by the strong preference of *L. notorcadensis* as well as other epizoa (colonial anthozoans and bryozoans) for the spines located on the aboral hemisphere of the sea urchins. (Auth.)

B-48252

Libertini, A., Lazzaretto, I., **Karyotype in an antarctic harpacticoid copepod: *Dactylopodia* sp.**, *Polar biology*, 1993 13(2), p.97-99, 19 refs.

On the basis of more than 100 observations of mitotic chromosomes of cleaving eggs, it was ascertained that the diploid number of *Dactylopodia* sp. is $2n=24$ elements. The karyotype is characterized by 6 metacentric and 6 sub-metacentric pairs of chromosomes; a satellite is frequently present in one of the largest sub-metacentric pairs. The great stability of chromosome number in harpacticoid copepods is confirmed by these results. (Auth.)

B-48253

Libertini, A., Lazzaretto, I., **Karyotype morphology in *Hyperietta dilatata* Stebbing 1888 (Amphipoda: Hyperiidae) from the Ross Sea (Antarctica)**, *Polar biology*, 1993 13(2), p.101-103, 17 refs.

The chromosome complement and some karyological features were investigated in the pelagic amphipod *Hyperietta dilatata* Stebbing 1888 from the Ross Sea. The diploid karyotype consists of 48 metacentric and 10 submetacentric elements ($2n=58$). The presence of secondary constrictions and supernumerary chromosomes is described. Available chromosome numbers of Hyperiidea exhibit a wide range of distribution, among which *H. dilatata* is the closest to the modal number of other amphipods. (Auth.)

B-48254

Worland, R., Block, W., Rothery, P., **Ice nucleation studies of two beetles from sub-antarctic South Georgia**, *Polar biology*, 1993 13(2), p.105-112, 31 refs.

Supercooling points of adults and larvae of the coleopterans *Hydromedion sparsutum* and *Perimylops antarcticus* at South Georgia ranged from -3.0 to -5.4 C with *Perimylops* freezing at c.1.6 C lower than *Hydromedion*. Intact excised guts from adults of both species froze c.1 C lower than the adult insects. Ice nucleating activity of homogenized faeces from larvae and adults of both species and excised guts were compared with three potential food plants using an ice nucleation spectrometer. Spectra showing the concentration of active ice nucleators over the temperature range 0 to -20 C were developed. These showed that nucleation occurred as high as -2 C in faecal material, and all insect samples nucleated above -3 C, whereas the plant materials nucleated between -4 and -5 C. Results are discussed in relation to ice nucleation in other insects. It is concluded that bacteria may be responsible for the high nucleation temperatures, and hence poor supercooling, in these South Georgia insects. An empirical model is developed for ice nucleation spectra based on these data. (Auth. mod.)

B-48255

Finotti, E., Moretto, D., Marsella, R., Mercantini, R., **Temperature effects and fatty acid patterns in *Geomyces* species isolated from antarctic soil**, *Polar biology*, 1993 13(2), p.127-130, 29 refs.

Geomyces and *Chrysosporium* species isolated from Antarctica were compared with a strain isolated from Italian soil. The Italian and antarctic strains had different growth rates and membrane fatty acids at different temperatures. (Auth.)

B-48256

Frenot, Y., **Introduced populations of *Dendrodrilus rubidus* ssp. (*Oligochaeta*:*Lumbricidae*) at Crozet, Kerguelen and Amsterdam Islands: effects of temperature on growth patterns during the juvenile stages**, *Soil biology & biochemistry*, Dec. 1992 24(12), International Symposium on Earthworm Ecology, 4th, Avignon, France, June 1990. Edited by A. Kretzschmar, p.1433-1439, 18 refs.

Dendrodrilus rubidus (Savigny, 1826), one of the worldwide distributed Lumbricidae, is present in many subantarctic islands. *D. r. tenuis* (Eisen, 1874) occurs at Possession I. and at Amsterdam I., while *D. r. norvegicus* (Eisen, 1874) is present at Kerguelen Is. Individuals of these 3 populations have been bred in order to compare their growth patterns at different temperatures and to demonstrate their parthenogenetic or self-fertilization abilities. Analysis of features of the juvenile stage from hatching to maturity is provided. It is shown that parthenogenesis, growth and reproductive abilities over a wide range of temperatures (8-20 C) are the main features which may explain the success of colonization and establishing *D. rubidus* ssp. in the French subantarctic islands. At 2 C, *D. r. tenuis* is active and grows slowly but is still juvenile after 300 days. The biological parameters studied provide a means to clearly discriminate the two subspecies *D. r. norvegicus* and *D. r. tenuis*. *D. r. norvegicus* shows a lower growth rate and a lower weight of individuals at every developmental stage, and the total duration of the juvenile stage is about one third longer than those of *D. r. tenuis* at Crozet. On the other hand, the *D. r. tenuis* populations from Crozet and Amsterdam show close growth patterns, even if some biological parameters, such as the specific growth rate or the duration of the juvenile stage, differ significantly between the two populations. (Auth.)

B-48258

Weller, G., **Antarctica and the detection of environmental change**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.201-208, 4 refs.

DLC QH301.R648a

Antarctica plays a critical role in global change because major interactions in this region among the atmosphere, ice, oceans, and biota affect the entire global system through feedbacks, dynamic biogeochemical cycles, deep ocean circulation, atmospheric transport of energy and pollutants, and changes in mass balance. Antarctica is also sensitive to global change and is a key area for detecting and monitoring environmental change. The parameters to be monitored in Antarctica, the deficiencies in the present measurements, and future methods and techniques were listed by the Scientific Committee on Antarctic Research (SCAR) as part of an overall global change research strategy for Antarctica, and are summarized in this paper. (Auth.)

B-48267

Callaghan, T.V., Sonesson, M., Sömme, L., **Responses of terrestrial plants and invertebrates to environmental change at high latitudes**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.279-288, Refs. p.285-287.

DLC QH301.R648a

Higher plants are likely to have higher productivity as temperatures and atmospheric CO₂ levels increase, but this productivity will be reduced by exposure to increasing UV-B radiation. Higher plants migrate more slowly than the rate at which climate is predicted to change, and many species will be trapped in supra-optimal climates. Both mosses and lichens can migrate faster than higher plants, propagules of non-polar species already reaching the Antarctic, but they have fewer mechanisms for responding to changing environments. Polar vegetation and ecosystems provide feedback to the climate system: positive feedbacks are associated with decreases in reflectivity and increased carbon emissions from warming soils. In the Antarctic, feedback and responses to environmental change will be smaller than in the Arctic because of the less responsive cryptogams which dominate the Antarctic, the paucity of antarctic soils, and geographical barriers to plant and invertebrate migrations. (Auth. mod.)

B-48268

Priddle, J., Smetacek, V., Bathmann, U.V., **Antarctic marine primary production, biogeochemical carbon cycles and climatic change**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.289-297, Refs. p.295-297.

DLC QH301.R648a

The southern ocean is heterogeneous, and no single factor controls primary production overall. Ice cover and vertical mixing influence algal growth rates by modulating radiance flux. Micronutrients, especially iron, may limit growth in some areas. Primary production is also suppressed by high removal rates of algal biomass. Grazing by zooplankton is the major factor determining magnitude and quality of vertical particle flux. Several of the physical controls on phytoplankton production are sensitive to climate change. Although it is impossible to make numerical predictions of future change on the basis of present knowledge, qualitative assessments can be put forward on the basis of model predictions of climate change and known factors controlling primary production. Changes in water temperature and in wind-induced mixing are likely to be slight and have little effect. Model predictions of changes in sea-ice cover vary widely, making prediction of biogeochemical effects impossible. Even if climatic change induces increased nutrient uptake, there are several reasons to suspect that carbon sequestration will be ineffective in comparison with continuing anthropogenic CO₂ emission. (Auth. mod.)

B-48269

Clarke, A., Crame, J.A., **Southern ocean benthic fauna and climate change: a historical perspective**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.299-309, Refs. p.307-309.

DLC QH301.R648a

The present benthic marine fauna of the southern ocean is rich and diverse, consisting of a mixture of taxa with differing evolutionary histories and biogeographical affinities, suggesting that at no time in the Cenozoic did continental ice sheets extend sufficiently to eradicate all shallow-water faunas around Antarctica at the same time. Nevertheless, certain features do suggest the operation of vicariant processes, and climate cycles affecting distributional ranges and ice-sheet extension may both have enhanced speciation processes. The overall cooling of southern high-latitude seas since the Mid-Eocene has been neither smooth nor steady. Intermittent periods of global warming and the influence of Milankovitch cyclicity is likely to have led to regular pulses of migration in and out of Antarctica. The resultant diversity pump may explain in part the high species richness of some marine taxa in the southern ocean. It is difficult to suggest how the existing fauna will react to present global warming. Although it is certain the fauna will change, as all faunas have done throughout evolutionary time, one cannot predict with confidence how it will do so. (Auth. mod.)

B-48270

Everson, I., **Managing southern ocean krill and fish stocks in a changing environment**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.311-317, Refs. p.316-317.

DLC QH301.R648a

Management of antarctic krill *Euphausia superba*, and the mackerel icefish *Champsocephalus gunnari* under the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) is discussed in relation to changes in their distribution and abundance arising from variation in circulation of the circumpolar current. It is concluded that on a southern ocean scale it is currently not possible to detect change, but on a local scale, such as at South Georgia, major changes are detectable. These changes affect the krill fishery directly in terms of total catch and the way the fleets are deployed. Major local reductions in krill are thought to have a significant effect on natural mortality of the icefish. (Auth.)

B-48271

Croxall, J.P., **Southern ocean environmental changes: effects on seabird, seal and whale populations**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.319-328, Refs. p.325-327.

DLC QH301.R648a

The main changes in the distribution and abundance of marine top predators in the Antarctic in the last two centuries were caused by human over-exploitation. Hypotheses that increases in populations of krill-eating penguins and seals represent recovery from exploitation, accelerated by removal of krill-eating whales, are being re-evaluated in the light of correlations between population size and reproductive success of seabirds and seals and various features of the biological and physical environment. These correlations involve phocid and otariid seals, penguins and flying birds, and sites ranging from the antarctic continent to subantarctic islands. Although the nature of, and balance between, physical and biological influences differ among sites, regions and different types of predator, processes (including potentially important links with the Southern Oscillation) involving sea-ice extent and distribution play a key role. Certain taxa, especially those of specialist ecology, extreme demography and restricted distribution (especially in high latitudes) are particularly vulnerable to at least some of the likely environmental changes. (Auth. mod.)

B-48279

Le Maho, Y., **Ecophysiological investigations on Adélie Coast** [Recherches ecophysiologiques en Terre-Adélie], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.61-65, In French with English summary.

French ecophysiological research on antarctic mammals and birds deals with the following metabolic regulations: cold adaptation in air and water and the mechanisms of heat production; adaptation to long-term fasting, regulation of the use of body fuels, interactions between energy reserves and breeding or molt, and the mechanisms triggering anorexia or refeeding. A particular feature of these programs is that they relate not only to the understanding of how antarctic animals are adapted to their extreme environment, but also to basic physiological and biochemical mechanisms of general interest for animal and human biology. (Auth. mod.)

B-48280

Cesar, R., Feller, G., Gerday, C., **Resolving the enigma of cold enzymes** [Les enzymes froides: une énigme à résoudre], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.66-71, In French with English summary. 4 refs.

The activity of enzymes is strictly dependent on temperature, and generally speaking the catalytic efficiency decreases by a factor close to 3 when the temperature is lowered by 10 C. One can therefore ask how ectothermic organisms living in antarctic sea water maintain metabolic rates comparable to those of homologous species inhabiting temperate or tropical waters. In fact, the activity of the enzymes of these cold-adapted species is high at low temperatures. This suggests numerous potential industrial applications. While the molecular basis for the temperature adaptation of thermostable enzymes produced by thermophilic organisms is reasonably well documented, only hypotheses have been formulated in the case of cold enzymes. The aim of the present research is to study the structure of several cold enzymes in order to define, at the molecular level, the adaptation of these enzymes to low temperatures. (Auth.)

B-48281

Bretagnolle, V., **Environmental prospects on Adélie Coast** [Quelles perspectives concernant l'environnement en Terre-Adélie?], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.75-76, In French.

In support of an argument for the need of environmental protection in Antarctica, the author examines the existing and projected negative effects of runway construction and other human activities on densely populated colonies of Emperor penguins, and on Giant and Fulmar petrels, on the Géologie Archipelago.

B-48295

Delille, D., **Marine microbiology of Adélie Coast** [La microbiologie marine en Terre Adélie], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.47-50, In French.

From a study of optimal growth temperature in a collection of 1,700 antarctic marine bacterial stocks isolated at +4 C, 5 principal classes are defined; the average optimal growth temperature is found to be about 30 C. Two conclusions are derived from the study: that antarctic bacteria are as numerous and as well diversified as those of more temperate marine environments, but that they are more active; and that the adaptation to temperatures near 0 C in bacteria isolated on the Adélie Coast is due more to tolerance than to necessity.

B-48307

Convey, P., **Seasonal lipid contents of antarctic microarthropods**, *Experimental and applied acarology*, 1992 15(4), p.219-231, 16 refs.

A technique for the accurate determination of lipid content of very small quantities of biological tissue was applied to 2 antarctic oribatid mites, *Alaskozetes antarcticus* and *Halozetes belgicae*, and a collembolan, *Cryptopygus antarcticus*. Analysis of monthly samples of the 3 species, collected between Nov. 1989 and Mar. 1991, revealed little evidence of any seasonal pattern of lipid deposition or use. Male *Alaskozetes* were the only exception, showing every low lipid levels for a short period of the austral summer, followed by rapid deposition before the onset of winter. Mean lipid contents of the 3 species over the study period were 10-15% of mean dry weight. There was evidence of a seasonal pattern of egg formation and oviposition in both *Alaskozetes* and *Halozetes*, but this was not reflected in the observed lipid levels. Feeding activity was mostly restricted to the summer months (Nov.-Mar.); a temporary resumption of feeding in winter (late Aug. 1990) was followed by an increase in lipid content in both sexes of *Alaskozetes*. (Auth.)

B-48318

Stenvers, O., Plötz, J., Ludwig, H., **Antarctic seals carry antibodies against seal herpesvirus**, *Archives of virology*, 1992 123(3-4), p.421-424, 12 refs.

Weddell seals in the Antarctic had high neutralizing antibody titres to seal- and feline herpesvirus and none against phocine distemper virus. Crabeater seals were free of antibodies. This suggests an evolutionary-wide spread of seal herpesvirus. (Auth.)

B-48319

Hansson, L.A., Lindell, M., Tranvik, L.J., **Biomass distribution among trophic levels in lakes lacking vertebrate predators**, *Oikos*, 1993 66(1), p.101-106, 30 refs.

The relative importance of nutrient supply and food chain composition for the structure and function of "two-level" South Georgian freshwater ecosystems was assessed. Along a productivity gradient of 19 lakes, the authors determined the abundance of bacteria, bacterivorous flagellates, and herbivorous macrozooplanktoners, as well as the concentrations of nutrients (phosphorus and nitrogen) and chlorophyll. The abundance of all organisms increased with increasing productivity, although chlorophyll concentration showed a damped increase compared with lower-latitude lakes with similar productivity. Moreover, the amount of chlorophyll per zooplankton grazer showed no increase with increasing productivity, indicating that grazing is a major structuring factor for algal biomass development. It is concluded that food chain theory may explain a considerable part of the variation in abundance of organisms of all size classes, including microorganisms. (Auth. mod.)

B-48320

Acosta Pomar, M.L.C., Bruni, V., Maugeri, T.L., **Picoplankton biomass in the Ross Sea (Antarctica)**, *Polar biology*, Feb. 1993 13(1), p.1-6, 28 refs.

Spatial distribution of picoplankton in the Ross Sea was studied. The authors discuss the biomasses of various picoplanktonic-sized fractions and of bacterial cells between 0.2 and 2.0 microns capable of growing on Marine Agar 2216 (Difco). Picoplankton of a cellular diameter between 1.0 and 2.0 microns (PP1) generally predominates, accounting for 73% of the whole picoplankton biomass. However, smaller cells (PP2) can represent 28% of the picoplankton biomass at depths corresponding to 1% of surface light. These results are in good agreement with those found in the coastal region of McMurdo Sound and in other areas of the Antarctic where total bacterioplankton was studied. Biomasses of total picoplankton (TPP) are not correlated with any of the environmental parameters studied. The PP1

is correlated with O₂ and silicates, and PP2 is correlated with O₂, phosphates temperature and nitrates. Aerobic heterotrophic biomasses are correlated with O₂ and salinity. (Auth.)

B-48321

Drits, A.V., Pasternak, A.F., Kosobokova, K.N., **Feeding, metabolism and body composition of the antarctic copepod *Calanus propinquus* Brady with special reference to its life cycle**, *Polar biology*, Feb. 1993 13(1), p.13-21, Refs. p.20-21.

In the Weddell Sea, several biochemical and physiological characteristics of copepodite stage III to adult females of *Calanus propinquus* from the surface layer (0-100 m) and the deep layer (500-1,000 m) were compared at a time of high phytoplankton abundance (Feb.) and a month later, when chlorophyll concentration was much lower and older copepodite stages had migrated to their overwintering depth. Daily rations of surface animals, estimated by the gut fluorescence method, varied from 0.8% to 7.8% body carbon (increasing with phytoplankton concentration). Respiration rate (calculated from measurements of electron-transport-system activity) and lipid and protein body content of animals inhabiting the surface layer decreased from Feb. to Apr. Deep water animals (stage V and adult females) were characterized by high lipid and protein content; their respiration and excretion rates were much lower than in surface copepods. Calculation showed that they could survive without an additional source of energy for 8-9 months. Based on biochemistry and physiology data, the possibility of a two-year life cycle is suggested. (Auth.)

B-48322

Branch, G.M., Attwood, C.G., Gianakouras, D., Branch, M.L., **Patterns in the benthic communities on the shelf of the subantarctic Prince Edward Islands**, *Polar biology*, Feb. 1993 13(1), p.23-34, 26 refs.

Benthic communities of Prince Edward Is. were sampled qualitatively with an epi-benthic sled at 57 stations over a 5 year period. Additional information on these communities was obtained from replicate underwater photographs. In total, 546 macrofaunal species were found. *Thourella variabilis* (Octocoralea), and *Cabarea darwinii* (Bryozoa) characterized deep rocky assemblages, and *Serpula vermicularis*, *Lanice conchilega* (Polychaeta) and *Magellania kerguelensis* (Brachiopoda) characterized soft substrata. Trends in percentage cover and densities of major taxa with respect to depth and substratum, as shown by photographs, are described. Deep, rocky substrata were dominated by Porifera, Bryozoa and Cnidaria, while soft-substrata were dominated by Polychaeta, Bivalvia and Brachiopoda. Errant forms consisted predominantly of Echinodermata, with Crustacea being important in shallower habitats. Filter-feeders dominated the benthos of the islands in all habitats. (Auth. mod.)

B-48323

Marin, V.H., Schnack-Schiel, S.B., **Occurrence of *Rhincalanus gigas*, *Calanoides acutus*, and *Calanus propinquus* (Copepoda: Calanoida) in late May in the area of the Antarctic Peninsula**, *Polar biology*, Feb. 1993 13(1), p.35-40, 23 refs.

The copepod species *Rhincalanus gigas*, *Calanoides acutus* and *Calanus propinquus* were studied in the area of the Antarctic Peninsula in May, 1986. *R. gigas* occurred in greatest densities in the upper layers of the water column, and copepodite stages CI and CII and nauplii dominated the population. Gut content analyses suggest that *R. gigas* was actively feeding. Copepodite stage CV dominated the *C. acutus* population. At two deep basin stations (water depth >1000 m) the *C. acutus* population occurred below 500 m, whereas at shallower stations the majority was found above 300 m. Most specimens had empty guts. *C. propinquus* occurred in low densities, mainly in the upper water layers, and copepodite stage CV dominated. Most individuals of stage V had food in their guts. Results suggest

that *C. acutus* had ceased feeding and was overwintering in a resting stage (diapause), while *C. propinquus* and *R. gigas* were still active, the latter species having finished a late autumn spawning. (Auth.)

B-48324

White, M.G., Piatkowski, U., **Abundance, horizontal and vertical distribution of fish in eastern Weddell Sea micronekton**, *Polar biology*, Feb. 1993 13(1), p.41-53, 41 refs.

The spatial distribution and species composition of ichthyonekton was investigated in the eastern Weddell Sea during Jan.-Feb. 1989. Early larval stages of 18 species, representing about 24% of the known Weddell Sea ichthyofauna, were present in the water column. The silver-fish *Pleuragramma antarcticum* overwhelmingly dominated the catches, comprising 84.5% of the 5022 specimens caught. The abundance of this species markedly increased towards the offshore end of the transect, with the highest numbers occurring near the shelf-break front associated with the westerly current of the southern limb of the Weddell Gyre. The increased abundance of *P. antarcticum* in continental slope waters was attributed to deflection of the East Weddell Coastal Current beyond the shelf/slope break by fringing ice shelves. Most larval and juvenile fish were found in the seasonally warmed upper 0-70 m layer of the Antarctic Surface Water where conditions occurred that appeared to be favorable to both feeding and growth. Cluster analysis indicated that inner-, central- and outer-shelf assemblages were represented, and that the species composition was most effectively described by reference to water mass and depth. (Auth. mod.)

B-48325

Dorne, A.J., Bligny, R., **Physiological adaptation to subantarctic climate by the Kerguelen cabbage, *Pringlea antiscorbutica* R.Br.**, *Polar biology*, Feb. 1993 13(1), p.55-60, 21 refs.

The Kerguelen cabbage *Pringlea antiscorbutica* is an endemic species restricted to some subantarctic islands. Up to now, all long term acclimation assays of Kerguelen cabbage in the temperate zones remained unsuccessful. In the field, the *Pringlea* leaf relative water content (RWC) never decreased below 83%. At the same time the leaf diffusion resistance (LDR) remained low, since the water flux was not limited in the plant, as in these islands the soil water content is permanently high. Severe water deprivation was necessary to induce stomatal closure with excised leaves. In parallel *in vitro* experiments, irreversible damage to photosynthesis and respiration were observed in leaf slices under osmotic stress. These results sustain the hypothesis that Kerguelen cabbage cannot support water deprivation and is probably specifically adapted to the subantarctic climate. (Auth.)

B-48326

Syvertsen, E.E., Kristiansen, S., **Ice algae during EPOS, leg 1: assemblages, biomass, origin and nutrients**, *Polar biology*, Feb. 1993 13(1), p.61-65, 15 refs.

Ice algae in infiltration assemblages were the dominating primary producers in the northwestern Weddell Sea during the austral spring of 1988. Band and sub-ice assemblages were encountered at a few stations only. Maximum ice algal biomass measured was 424 micrograms Chl.a/l compared to less than 0.4 microgram Chl.a/l in the water column. Biomass and nutrient concentrations in the infiltration layer decreased inward from the edge of ice floes. The composition of algal groups indicated that the concentric distribution was due to migration by mobile taxa. Various procedures for melting of ice-containing samples of algae were tested. Melting in dialysis tubing seemed to have advantages over other methods, especially for cells to be used in physiological experiments. (Auth.)

B-48327

Janssen, H.H., Hoese, B., **Marsupium morphology and brooding biology of the antarctic giant isopod, *Glyptonotus antarcticus* Eights 1853 (Crustacea, Isopoda, Chaetiliidae)**, *Polar biology*, Apr. 1993 13(3), p.145-149, 15 refs.

The marsupium of the antarctic giant isopod, *Glyptonotus antarcticus* Eights 1853, has unique characteristics. It deviates in its proportions and construction from the so-called *Idotea* type of brood pouch found in other marine isopod species; some features even remind one of the so-called *Porcellio* type of marsupium which is typical of terrestrial isopods. Details are described by scanning electron microscopy. Observations and reviewed data suggest that, during the prolonged incubation of brood, adelphophagy contributes to the nourishment of the developing young. It is assumed that additional nutrition is provided by maternal secretion. These suggestions would partly explain marsupial conditions in *G. antarcticus* as an adaptation to slow development in an adverse environment. Two species of epizoa, a turbellarian and a fish leech, were found to occur on *G. antarcticus* in the vicinity of the marsupium. (Auth.)

B-48328

Overhoff, A., Freckman, D.W., Virginia, R.A., **Life cycle of the microbivorous antarctic Dry Valley nematode *Scottinema lindsayae* (Timm 1971)**, *Polar biology*, Apr. 1993 13(3), p.151-156, 29 refs.

The life cycle of the Dry Valley soil nematode *Scottinema lindsayae* (Timm 1971) was studied in laboratory culture at two temperatures, 10 C and 15 C. Soil yeast and bacteria isolated with the nematodes were used as the food source. The species reproduced sexually. The higher temperature had a negative effect on the life cycle. The number of eggs per female and the number of juveniles developing per female were greater at 10 C than at 15 C. Juveniles developed faster at 10 C and four juvenile stages were observed outside of the egg at both temperatures. The unusually long life cycle (218 d at 10 C) suggests that more than one austral summer may be required for successful completion. An increase in Dry Valley soil temperatures associated with potential global environmental change may have detrimental effects on soil nematodes. (Auth.)

B-48329

Schwarz, A.M.J., Green, J.D., Green, T.G.A., Seppelt, R.D., **Invertebrates associated with moss communities at Canada Glacier, southern Victoria Land, Antarctica**, *Polar biology*, Apr. 1993 13(3), p.157-162, Refs. p.161-162.

The invertebrate faunal composition of moss-dominated flushes near the Canada Glacier was, as in similar habitats in continental antarctic regions, numerically dominated by protozoa, rotifers, nematodes and tardigrades. Mites were of lesser abundance. Although collembola occur in the Taylor Valley, none were found at the study site. The finding of a catenulid flatworm is significant as microturbellarians have only rarely been recorded from Antarctica. Nematode, tardigrade and rotifer densities recorded were comparable to those in other antarctic regions. These groups were found at a mean depth ranging from 5 to 10.83 mm in the moss. There was a greater percentage of all groups in the upper 5 mm of moss cores in post-melt samples than in pre-melt samples. (Auth.)

B-48331

Loeb, V.J., Amos, A.F., Macaulay, M.C., Wormuth, J.H., **Antarctic krill stock distribution and composition in the Elephant Island and King George Island areas, January-February, 1988**, *Polar biology*, Apr. 1993 13(3), p.171-181, 35 refs.

Information is provided on the distribution, size and maturity composition of antarctic krill stocks in the Elephant I. and King

George I. areas, and at repeatedly sampled sites to the north of each island, during Jan.-Feb., 1988. The overall distributional patterns of different sizes and maturity stages demonstrated a seasonal progression of those observed in the Antarctic Peninsula region during Nov.-Dec., 1987 by Siegel (1989). The krill sampled at each island site represented different size-maturity groups, and demonstrated different horizontal and vertical distributional characteristics. These distributional differences may be related to the demographic differences and/or hydrographic differences between the two sites. (Auth.)

B-48332

Villafañe, V., Helbling, E.W., Holm-Hansen, O.,
Phytoplankton around Elephant Island, Antarctica, *Polar biology*, Apr. 1993 13(3), p.183-191, Refs. p.190-191.

Phytoplankton studies were conducted around Elephant I. during Jan.-Mar. 1991. In addition to profiling studies at 50 stations during each of two cruises, pumped surface water was used to continuously record *in vivo* chlorophyll-*a* fluorescence and beam attenuation coefficients. Measurements on discrete samples included chl-*a*, phytoplankton organic carbon, and total particulate organic carbon (POC). Phytoplankton abundance increased from Jan.-Feb. to Feb.-Mar. as evidenced by mean surface chl-*a* values. Microplankton accounted for 29% (cruise I) and 40% (cruise II) of the total phytoplankton, based on direct measurements of chl-*a*. Patterns for integrated values of chl-*a*, phytoplankton organic carbon and POC were similar to patterns of concentrations in surface waters. The richest areas of phytoplankton were north of Elephant and King George Is., which coincided with high krill density areas. (Auth. mod.)

B-48333

Duhamel, G., Kock, K.H., Balguerías, E., Hureau, J.C.,
Reproduction in fish of the Weddell Sea, *Polar biology*, Apr. 1993 13(3), p.193-200, Refs. p.199-200.

Reproductive characteristics of 28 fish species were obtained during EPOS leg 3 in the inner Weddell Sea. The gonadosomatic index (GSI) of female notothenioid fish was 15-30% at spawning. GSI in males was much less. Length at first spawning was attained from c. 70% of the maximum total length onwards. As in species of the low-Antarctic Zone, gonad maturation was obviously a biennial process. More species in the high-Antarctic Zone spawn in summer and winter than in the low-Antarctic Zone where spawning in autumn/winter prevails. Fecundity was positively correlated with fish length and weight among most species. Fecundity exceeds 10,000 eggs only in a few nototheniid species. Egg diameter is commonly 3.5-5.0 mm, with icefish having the largest egg sizes. Eggs of most species are probably left unattended, but nest guarding was suspected in the less fecund species. The results are discussed in comparison to reproduction in notothenioid fish inhabiting the low-Antarctic Zone. (Auth.)

B-48334

Granéli, E., **Influence of copepod and krill grazing on the species composition of phytoplankton communities from the Scotia-Weddell Sea, *Polar biology***, Apr. 1993 13(3), p.201-213, Refs. p.211-213.

The influence of copepods (mainly *Oithona similis*) and krill grazing on the species composition of plankton communities in shipboard containers was investigated during the spring and post-spring period in the Scotia and Weddell seas. Experiments show that copepods cannot control phytoplankton biomass in shipboard cultures even at artificially elevated numbers. Krill at concentrations similar to those in natural swarms have a great impact on both phytoplankton biomass and species composition in shipboard cultures. Both copepods and krill may have an impact on phytoplankton species composition and biomass *in situ*, since the rates of phytoplankton cell division were probably artificially increased in shipboard cultures compared to natural conditions, where lower growth rates make phytoplankton more

vulnerable to grazing. A similarity between phytoplankton successions in containers and *in situ*, especially with respect to krill grazing, supports the conclusion that grazing may structure phytoplankton communities in the Scotia and Weddell seas. (Auth. mod.)

B-48335

Gordon, J.E., Harkness, D.D., **Magnitude and geographic variation of the radiocarbon content in antarctic marine life: implications for reservoir corrections in radiocarbon dating, *Quaternary science reviews***, 1992 11(7/8), p.697-708, 65 refs.

Radiocarbon age estimates on marine-derived materials from the Antarctic appear old in comparison with the terrestrial radiocarbon timescale as a result of significantly depleted C-14 concentrations in antarctic seas. Measurements of C-14 concentrations in modern antarctic marine life from South Georgia, the Shetland Is. and Antarctic Peninsula are reviewed and correction factors required to relate radiocarbon measurements on fossil marine materials from these areas to the conventional radiocarbon timescale are suggested. For dates based on shells, seaweeds, seal bones and penguin bones the minimum correction factor for South Georgia is *ca.* 750 years and for the South Shetland Is. and Antarctic Peninsula it may be up to 1250-1300 years. For whalebones, a minimum correction of 1000 years may apply over a wide geographic area. For comparison, the authors also reviewed radiocarbon measurements on marine species and seawater from other sectors of the Antarctic. In high latitudes, correction factors of *ca.* 1400 years are generally applicable to shell, seal and penguin samples. (Auth.)

B-48336

Friedmann, E.I., Kappen, L., Meyer, M.A., Nienow, J.A.,
Long-term productivity in the cryptoendolithic microbial community of the Ross Desert, Antarctica, *Microbial ecology*, Jan.-Feb. 1993 25(1), p.51-69, 45 refs.

Annual gross productivity of the lichen-dominated cryptoendolithic community was calculated from computer analysis of photosynthetic response, based on laboratory measurements of CO₂ exchange and three years (1985-1988) of field nanoclimate data. Details of photosynthetic optimum, total time available for metabolic activity, gross productivity, and net ecosystem productivity were also obtained from the computer record and are presented. The yearly gross productivity of the cryptoendolithic microbial community of the entire Ross Desert area was estimated at approximately 120,000-180,000 kg C. Of this, 600-900 kg C is in microbial biomass, and much of the rest is soluble compounds that leach into the rocks and possibly percolate to the valleys, providing a source of organic matter for lakes, rivers, and soils. (Auth. mod.)

B-48337

Hartmann, G., **Antarctic benthic ostracods. VIII. Ostracods from the Cruise ANT. 11/4 of RV *Meteor* to Elephant Island and the Antarctic Peninsula [Antarktische benthische Ostracoden. VIII. Auswertung der Reise der "Meteor" (ANT.11/4) in die Gewässer um Elephant Island und der Antarktischen Halbinsel], *Helgoländer Meeresuntersuchungen***, 1992 46(4), p.405-424, In German with English summary. 9 refs.

The present paper deals with ostracods collected in Antarctica during the voyage of RV *Meteor* (11/4) in Dec. and Jan. 1989/90 in waters around Elephant I. and west of the Antarctic Peninsula between 61 and 67S and 54 and 69W. Thirty-eight of the 50 species sampled were already known to science, but 4 new species have been found, while 8 have to remain in open nomenclature. For the first time, a species of the subfamily Paracytherideinae was discovered in Antarctica. Additional material from *Cytheropteron insulelephantensis*, described earlier from Elephant I. and rediscovered now at two more stations, shows that this species has to be placed into the genus

Nodobythere. The systematical part of the paper contains the description of the new species and new data for species previously treated, while the list of species and the list of stations contains all the species that were collected. (Auth.)

B-48338

Treub, L.F., **Penguins in the Antarctic** [Pinguine in der Antarktis], *Naturwissenschaftliche Rundschau*, Feb. 1993 46(2), p.63-66, In German.

Penguins are flightless ocean dwellers of the south polar regions and the southern coasts of Australia, Africa, and South America. During the breeding season they populate remote coastal areas by the thousands and show a highly developed social life; the rest of the time is spent in diving into the sea, swimming and foraging. Adélie, jackass, and chinstrap penguins brood together in large colonies on the northern and western Antarctic peninsula, and on the South Orkney and South Shetland Islands.

B-48341

Lyons, D., **Environmental impact assessment in Antarctica under the Protocol on Environmental Protection**, *Polar record*, Apr. 1993 29(169), p.111-120, 28 refs.

The background to the development and implementation of environmental impact assessment procedures in Antarctica is reviewed, and the principles and procedures of the Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol of 1991) are outlined. The difficulties in determining the appropriate level of assessment and the practical operational aspects of carrying out the evaluations are examined. Particular attention is given to the meaning of terminology in the Protocol, the interpretation of environmental principles and standards, alternatives to the proposed activity, the requirements for sufficient information, the process of obtaining and taking into account public comment, the monitoring of environmental indicators, and the practical implications where an activity needs to be suspended, cancelled, or modified. The workloads generated by the procedures and the credibility of the processes are discussed in view of a possible perception that the exercises may amount to little more than 'red tape' to justify decisions that would be taken in any case. Recommendations are made that could improve the EIA process in Antarctica. (Auth.)

B-48342

Dalziell, J., De Poorter, M., **Seabird mortality in longline fisheries around South Georgia**, *Polar record*, Apr. 1993 29(169), p.143-144, 8 refs.

The report gives details of bird deaths during encounters with Russian fishing vessels. These chance meetings resulted in casualties among albatrosses and petrels which became entangled in the fishing lines while attempting to remove bait from the hooks in the long lines. Greenpeace observers were nearby to verify compliance with CCAMLR provisions to minimize bird deaths arising from use of long line techniques. There appeared to be enough incidental bird deaths to cause concern for population declines in these species.

B-48357

Jennings, J.C., Jr., Gordon, L.I., **Mixed-layer nutrient contributions in the Weddell Gyre: winter 1989 and late austral spring 1990**, *Antarctic journal of the United States*, 1991 27(5), p.99-101, 7 refs.

In this article, the surface mixed-layer nutrient and dissolved-oxygen concentrations found during the two cruises are compared in an effort to assess their interannual and wintertime variabilities. Despite its name, the SWGS 90 cruise took place in early spring when the region was still covered with seasonal pack ice. The ice-covered surface mixed layer in the Weddell Gyre is quite homogeneous vertically in all chemical and physical properties throughout the winter and early spring. It remains homogeneous until solar heating and ice-

melt dilution can establish the seasonal pycnocline and facilitate the summer phytoplankton bloom. Keeping in mind that mixing from below with Warm Deep Water and some biological changes do continue during the period of ice cover, the authors compare the mixed-layer observations on the two cruises by a plot of near-surface values vs. latitude or longitude. The objective is to estimate the typical interannual and spatial variability of the chemical constituents of the surface winter water.

B-48361

May, S.E., McClennen, C.E., Domack, E.W., **Diatom assemblages within surface waters of Andvord Bay, Antarctica**, *Antarctic journal of the United States*, 1991 27(5), p.112-114, 5 refs.

In Dec. 1990, during R/V *Polar Duke* cruise 90-7, near-surface water samples were taken in 5 liter Niskin bottles along a cruise track to gather diatom assemblages with simultaneous conductivity-temperature-depth-transmissivity data in the fjord. The goal was to understand more fully the processes controlling productivity and, ultimately, the high sedimentation rates. This preliminary study concentrated on identifying and enumerating diatoms from filtered seawater within four geographically distinct areas in the bay: the shelf (station 1), mid-bay (station 5), nonglacial near-shore (station 8), and glacial near-shore (stations 12 and 18). Water samples were subsampled to 1,000 ml and filtered through preweighted 0.4 micrometer Nucleopore filters. The filters were dried and reweighed, and five filters were chosen to represent the four areas of interest. These were each subsampled three times (24 sq mm of surface area each), carbon and gold coated, and examined using scanning electron microscopy. Polaroid photographs of random areas of the filter subsamples were used to identify and enumerate diatom cells with the aid of magnifying lenses. Cell counts were standardized to cells per liter, and diversity per sample was determined using Simpson's index.

B-48364

Leventer, A., **Surface-sediment diatom assemblages from the George V Coast**, *Antarctic journal of the United States*, 1991 27(5), p.120-122, 12 refs.

Diatom distribution in the surface sediments in the waters off the George V Coast is displayed in a series of five charts showing the overall absolute diatom distribution in the area and the percentages of these four species comprising the whole: *Nitzschia curta*, *Nitzschia Kerguelensis*, *Thalassiosira* spp. and *Chaetoceros* spp. Explications are given of each chart to emphasize the special features of each species.

B-48384

Coulson, R., Coulson, G., **Diets of the Pacific Gull *Larus pacificus* and the Kelp Gull *Larus dominicanus* in Tasmania**, *Emu*, Mar. 1993 93(1), p.50-53, 31 refs.

The Pacific gull *Larus pacificus* is endemic to Australia, while the Kelp gull *L. dominicanus* has a circumaustral distribution and has become established in Australia only in the present century. Since the two species are similar in size and morphology, it could be expected that they would compete for resources, including food. In this paper the authors present data on the diets of sympatric Pacific and Kelp gulls in southeastern Tasmania, and summarize other data on the diets of the two species, including Macquarie I. and the Antarctic Peninsula, allowing some comparisons to be made.

B-48391

Hopkins, T.L., Lancraft, T.M., Torres, J.J., Donnelly, J., **Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988)**, *Deep-sea research*, Jan. 1993 40(1), p.81-105, 52 refs.

Zooplankton community structure and trophic ecology were investigated in the marginal ice zone of the southern Scotia Sea during

the austral winter of 1988 as part of the AMERIEZ program. In the study area near the South Orkneys, water emerging from the Weddell Sea mixes with Scotia Sea water to form a complex field of mesoscale eddies and meanders. Three primary zooplankton communities were identified: a shallow cold water assemblage typical of Weddell Sea water; a shallow/upper mesopelagic assemblage of subantarctic species introduced into the southern Scotia Sea with warm core eddies from the Polar Front; and a deep (>400 m) mesopelagic community with circumantarctic species. Diet analysis of 35 dominant species revealed five feeding guilds among the zooplankton. One consisted primarily of small herbivorous copepods. Two closely related guilds consisting of copepods, krill and salps were omnivorous, feeding on phytoplankton, protozoans, metazoans and crustacean debris (molts). Two guilds were constituted by predatory copepods and chaetognaths. A sixth group, all copepods, which included important numerical and biomass dominants of the region was, with two exceptions, trophically inactive. The exceptions were the biomass dominants *C. propinquus* and *M. gerlachei*, which were actively feeding in winter. Phytoplankton biomass was low in winter, averaging two-thirds that in fall. (Auth. mod.)

B-48396

Williams, T.D., **Reproductive endocrinology of macaroni (*Eudyptes chrysolophus* and gentoo (*Pygoscelis papua*) penguins. I. Seasonal changes in plasma levels of gonadal steroids and LH in breeding adults**, *General and comparative endocrinology*, Feb. 1992 85(2), p.230-240, 41 refs.

Changes in plasma luteinizing hormone (LH), testosterone, oestradiol, and progesterone were measured throughout the breeding and molt cycle in free-living male and female macaroni and gentoo penguins at Bird I. In macaroni penguins plasma levels of all hormones, except LH in males, were significantly elevated at the time of arrival at the breeding colony. In both species and sexes plasma LH, testosterone, and estradiol levels were higher during nest-building and post-copulation, coincident with the period of frequent agonistic interactions in males and egg-formation in females. Elevated testosterone levels occurred in females of both species during the postcopulation period and may be associated behaviorally with both sexes being involved in nest defense. Male birds also had elevated estradiol levels. Following copulation, plasma levels of LH, testosterone, and estradiol decreased to basal levels in both sexes and species and, except for a transient increase in testosterone in male macaroni penguins, remained low through to the end of molt. There was no associated rise in LH or testosterone during premolt and early molt despite a further period of agonistic and social interaction, suggesting that birds were in a photorefractory state at this time. Plasma progesterone showed a pattern of variation different from that of the other hormones. In both species and sexes, plasma levels were elevated between arrival and early chick-rearing and then decreased slowly to low levels during molt. (Auth. mod.)

B-48397

Williams, T.D., **Reproductive endocrinology of macaroni (*Eudyptes chrysolophus*) and gentoo (*Pygoscelis papua*) penguins. II. Plasma levels of gonadal steroids and LH in immature birds in relation to deferred sexual maturity**, *General and comparative endocrinology*, Feb. 1992 85(2), p.241-247, 26 refs.

Plasma levels of LH, testosterone, estradiol, and progesterone were measured during the breeding season in adult and immature macaroni and gentoo penguins at Bird I. in relation to deferred sexual maturity. Macaroni penguins do not breed until 6-8 years of age whereas gentoo penguins first breed at 2 years of age. Plasma LH was elevated in 3- to 5-year old macaroni penguins, but not in 1- to 2-year old birds nor 1-year old gentoos. However, 1-year olds of both species responded to an injection of exogenous LH-RH by in-

creasing LH secretion. Some individual 3-, 4-, and 5-year old macaroni penguins had circulating testosterone levels within the range of peak values in adults, suggesting that in males, gonads were physiologically mature several years in advance of the age of first breeding. One-year old macaroni penguins had elevated progesterone levels and basal estradiol levels, but in 2-4 year olds the plasma levels of both progesterone and estradiol were low. This does not support the hypothesis that high progesterone levels "block" ovarian maturation in immature penguins. Immature gentoo penguins showed a different pattern of hormone secretion. Plasma testosterone was low in all breeding periods, but estradiol levels increased to a peak during the incubation period, 4 weeks later than when peak values occurred in adults. In both species, therefore, deferred sexual maturity was associated with delayed and/or reduced secretion of LH and gonadal steroids. (Auth. mod.)

B-48402

Pereira Brandini, F., **Phytoplankton biomass in an antarctic coastal environment during stable water conditions—implications for the iron limitation theory**, *Marine ecology progress series*, Mar. 11, 1993 93(3), p.267-275, Refs. p.274-275.

The summer plankton community of Admiralty Bay was studied in Feb. 1987 under stable water column conditions which developed inside the bay after an unusually long period of predominant moderate to low wind speeds. The bay contained Fe in non-limiting concentrations, and the hypothesis was tested that Fe enrichment in natural environments would increase phytoplankton biomass. The phytoplankton was numerically dominated by nanoflagellates and small pennate diatoms. The protozoans were dominated by tintinnids and heterotrophic dinoflagellates, mainly *Gymnodinium* spp. Although the light/nutrient regime was optimum for autotrophic growth, the grazing pressure of microzooplankton precluded phytoplankton biomass accumulation, maintaining low chlorophyll *a* concentrations throughout the whole bay area during the 7 d of survey. The overall conclusion is that Fe enrichment of natural environments dominated by the microbial network may not result in high algal biomass. (Auth.)

B-48404

Kornicker, L.S., ed, **Biology of the antarctic seas XXI**, *American Geophysical Union. Antarctic research series*, 1990 Vol.52, 236p., Refs. passim. For individual papers see B-48405 through B-48407.

DLC QH95.58.B56

This volume is part of a book series designed to provide a medium for the presentation of scientific research results from Antarctica, particularly the results of the U.S. Antarctic Program. Three papers are presented; they deal with the systematics of marine eunicemorph polychaete annelids, the morphology of antarctic Halacaroida, and the taxonomy of some leeches of the southern ocean.

B-48405

Orensanz, J.M., **Eunicemorph polychaete annelids from antarctic and subantarctic seas—with addenda to the Eunicemorpha of Argentina, Chile, New Zealand, Australia and the southern ocean**, *American Geophysical Union. Antarctic research series*, 1990 Vol.52, p.1-183, Refs. p.175-183.

DLC QH95.58.B56

The eunicemorph polychaetes from antarctic and subantarctic seas are reviewed, and new data adding to the knowledge of the eunicemorphs from New Zealand, Australia, Chile, and Argentina have been included. The systematics of the order Eunicemorpha is discussed, and suggestions are made pertinent to the status and definition of some families. It is proposed to merge the Lysaretidae with the Lumbrineridae, and the Oeononidae with the Aramburidae, and to redefine the Lophitimidae as a family independent of the Dorvilleidae.

Abyssoninoe, new genus, is erected for lumbrinerids in the "abyssorum" group of *Lumbrineris* sensu lato. The lumbrinerid genus *Eranno* Kinberg is revived and redefined, and *Lumbrineris* Blainville is restricted. Three new genera, *Mammiphitime*, *Pinniphitime*, and *Palpiphitime*, are erected within the Iphitimidae. New species are described, the diagnosis of several species is substantially expanded, and new synonymies are presented in many cases, largely based on the reexamination of collections studied by other authors. (Auth. mod.)

B-48406

Bartsch, I., **Antarctic Halacaroida (Acari): genera *Agaue*, *Bradyagaue*, and *Halacarellus*, American Geophysical Union. Antarctic research series, 1990 Vol.52, p.185-217, 16 refs.**

DLC QH95.58.B56

The halacarid genera most likely to be found in antarctic waters are *Agaue*, *Bradyagaue*, and *Halacarellus*. These genera are abundant in samples from littoral and bathyal regions and are represented by rather large-sized species. The antarctic species are described and figured. Also treated are species which are common in subantarctic regions and which probably penetrate into the antarctic zone. A key to the species is presented. (Auth.)

B-48407

Meyer, M.C., Burreson, E.M., **Some leeches (Hirudinea: Piscicolidae) of the southern oceans, American Geophysical Union. Antarctic research series, 1990 Vol.52, p.219-236, Refs. p.234-236.**

DLC QH95.58.B56

Marine leeches examined from many collections south of latitude 35S included 12 species. *Ichthyobdella tentaculata* Cordero, *Trullibdella capitis* Brinkmann, *Cryobdellina bacilliformis* Brinkmann, *Antarctobdella tcherniai* Dollfus, *Ophthalmobdella bellisioi* Szidat, *Trulliobdella alba* Epshtein, and *Antarctobdella crozetensis* Sawyer were all considered to be junior synonyms of *Notobdella nototheniae* Benham. Other Platybdellinae identified were *Platybdella levigata* (Harding), *Glyptonotobdella antarctica* Sawyer and White, *Austrob-della bilobata* Ingram, and *Pterobdellina australis* Epshtein. Pontobdellinae included *Stibarobdella tasmanica* (Hickman), and *Megaliobdella szidati* gen. et sp. nov. characterized by total length up to 340 mm and from 18 to 25 large tubercles on each of the 12 annuli of urosome somites. Piscicolinae included *Trachelobdella lubrica* (Grube), *T. australis* Blanchard, *T. glabra* Moore, *Galatheabdella brunni* Richardson and Meyer, and *T. bathyrajae* sp. nov. characterized by 11 pairs of pulsatile vesicles, a terminal, tubular caudal sucker, six pairs of testisacs, large convoluted bursa, and absence of vector and conducting tissue. *T. glabra*, studied internally for the first time, has an unusually long and convoluted proboscis/esophagus complex. (Auth.)

B-48421

Koda, H., **Survey of emperor penguins during 1990 (JARE-31), Polar news, Aug. 1991 No.53, p.52-55, In Japanese.**

In Sep. 1990, as part of JARE-31, the 31st Japanese Antarctic Research Expedition with a party of four took SM 254 and SM 409 snow vehicles, two large sleds and a small sled, to visit an emperor penguin rookery on the sea ice off the Riiser Larsen Peninsula, about 200 km west of Showa Station. Their trip and camps along the way are described. Emperor penguins breed on the ice in winter when temperatures drop below -40 C, incubate only one egg at a time, and fast during the breeding period. It was estimated that the rookery had about 10,000 adults and about 10,000 chicks.

B-48422

Garrison, D.L., Buck, K.R., Gowing, M.M., **Winter plankton assemblage in the ice edge zone of the Weddell and Scotia Seas: composition, biomass and spatial distributions, Deep-sea research, Feb. 1993 40(2), p.311-338, Refs. p.335-338.**

The biomass and distribution of phytoplankton and protozooplankton at an advancing ice edge in the Weddell and Scotia Seas during the early austral winter were examined. The advance of ice cover, local melting of sea ice and advection of water masses, possibly from lower latitude regions, were the main sources of variability in the physical regime of the ice-edge zone. Autotrophic dinoflagellates dominated phytoplankton stocks, followed by other autotrophic nanoflagellates and diatoms in decreasing biomass. Heterotrophic flagellates dominated protozooplankton biomass followed by ciliates and sarcodines. Although phytoplankton stocks were higher at non ice-covered than at ice-covered stations, there were no distinct differences between ice-edge stations and those north of the furthest ice extent. It is hypothesized that advection of sea ice into water above the freezing point and subsequent melting of ice probably affected much of the study area, so that any effects of "enhanced production" in the ice-edge zone would have been difficult to resolve. It is concluded that neither algal nor bacterial production was sufficient to produce an enrichment of protozooplankton stocks in the ice-edge zone. Calculations of a carbon budget suggested that bacterial production was a significant proportion of total production and that the nano- and microheterotrophs must predominate in the utilization of both phyto- and bacterioplankton production at the winter ice edge. (Auth. mod.)

B-48424

Prince, P.A., Rodwell, S., Jones, M., Rothery, P., **Moult in Black-browed and Grey-headed albatrosses *Diomedea melanophris* and *D. chrysostoma*, Ibis, Apr. 1993 135(2), p.121-131, 12 refs.**

The age of individual wing and tail feathers of Black-browed and Grey-headed albatrosses *Diomedea melanophris* and *D. chrysostoma* of known age and breeding status at Bird I. was recorded. Breeders and non-breeders of both species moult their rectrices annually. Non-breeders moult primaries biennially. In the first year of a cycle, the outer three and some inner primaries are moulted descendantly; in the next year the inner primaries are moulted ascendantly, starting from primary seven. There is a general progression to moulting equal numbers of primaries in each half of the cycle by the time breeding starts at about 10 years of age. Grey-headed albatrosses usually moult fewer primaries than Black-browed albatrosses. Comparisons between species and between failed and successful birds within species indicate that moult rate is not closely linked to the length of the interval between breeding attempts. Interspecies differences are better explained by breeding latitude, with tropical albatrosses moulting twice as fast as subantarctic species, possibly reflecting food availability outside the breeding season. (Auth. mod.)

B-48427

Madureira, L.S.P., Ward, P., Atkinson, A., **Differences in backscattering strength determined at 120 and 38 kHz for three species of antarctic macroplankton, Marine ecology progress series, Feb. 23, 1993 93(1-2), p.17-24, Refs. p.23-24.**

The ability to acoustically separate zooplankton species is an important requirement for ecological studies and to improve biomass estimates. In order to distinguish between *Euphausia superba* and other swarm-forming macroplankters the authors used a dual frequency echo-sounder (120 and 38 kHz) and echo-integrator during a series of Longhurst Hardy Plankton Recorder (LHPR) hauls near South Georgia. The authors compared the acoustic parameter Mean Volume Backscattering Strength (MVBS) according to the equation:

Δ MVBS (dB) = MVBS 120 kHz - MVBS 38 kHz. Mean values of Δ MVBS for *E. superba*, *Themisto gaudichaudii* and *E. frigida* were 4.6, 9.7 and 15.6 dB, respectively, and were significantly different, allowing the 3 species to be distinguished acoustically. (Auth.)

B-48434

Hayward, P.J., Ryland, J.S., **Taxonomy of six antarctic anascan Bryozoa**, *Antarctic science*, June 1993 5(2), p.129-136, 14 refs.

Six species of anascan cheilostome Bryozoa are described from Antarctica. *Apiophragma* gen. nov. is introduced for *Megapora hyalina* Waters, 1904. *Cellaria dennanti* Waters, 1904 non MacGillivray, 1895 is redescribed as *Swanomia belgica* sp. nov. *Paramawsonia* Androsova, 1972 is restricted to its type species, *Cellaria dennanti* MacGillivray, 1895. *Micropora notialis* sp. nov. is distinguished from *M. brevissima* Waters, 1904. Two new species are described in the genus *Cellaria*. (Auth.)

B-48435

Izaguirre, I., Mataloni, G., Vinocur, A., Tell, G., **Temporal and spatial variations of phytoplankton from Boeckella Lake (Hope Bay, Antarctic Peninsula)**, *Antarctic science*, June 1993 5(2), p.137-141, 13 refs.

The main water body at Lake Boeckella was sampled at 4 sites for phytoplankton during summer 1991 to assess the influence of nutrients from nearby penguin rookeries on both phytoplankton density and composition. The site, located at the base of the rookeries, had total phosphorus values comparable to those reported from the most eutrophic antarctic lakes. During the ice-free period most of the Chlorophyceae and Cyanophyceae recorded were concentrated at this site. Phytoplankton density increased strongly in the area opposite to the rookeries where ice began to form; an under-ice bloom of *Ochromonas aff. ovalis* (Chrysophyceae) was observed in this area. (Auth.)

B-48436

Kooyman, G.L., **Breeding habitats of emperor penguins in the western Ross Sea**, *Antarctic science*, June 1993 5(2), p.143-148, 11 refs.

Within the western Ross Sea there are 6 emperor penguin colonies of widely different sizes that occur exclusively on sea ice. In 1990 a survey of all six sites, two by close overflights and four from the ground, showed that the breeding habitats were highly variable. The most important physical characteristics of these habitats appear to be stable fast ice, nearby open water, access to fresh snow, and shelter from the wind. (Auth.)

B-48437

Nichols, D.S., Nichols, P.D., McMeekin, T.A., **Polyunsaturated fatty acids in antarctic bacteria**, *Antarctic science*, June 1993 5(2), p.149-160, Refs. p.159-160.

Thirty-eight strains of antarctic bacteria were screened for the ability to produce polyunsaturated fatty acids (PUFA). Although the data set is currently small, the proportion of antarctic strains found to produce PUFA is higher than that found for temperate marine bacteria (and is similar to that recorded for barophilic bacteria). This suggests that the antarctic environment has naturally selected for bacterial strains capable of maintaining membrane lipid fluidity by the production of PUFA. These results highlight the potential of antarctic bacteria for possible consideration in the industrial production of PUFA. The fatty acid composition of *Flectobacillus glomeratus* is reported and discussed in relation to other closely related antarctic flavobacteria. Fatty acid composition is also shown to represent an important chemotaxonomic tool to aid with the identification of antarctic bacteria. (Auth. mod.)

B-48438

Sicinski, J., Janowska, E., **Polychaetes of the shallow sublittoral of Admiralty Bay, King George Island, South Shetland Islands**, *Antarctic science*, June 1993 5(2), p.161-167, 24 refs.

Twenty-five species of Polychaeta were recorded in soft bottom samples collected from 4-30 m. Total abundance of polychaetes ranged from 60 to 3300/sq m. High abundance values were locally recorded for *Microspio moorei*, *Tharyx epitoca* and *Ophelina syringopyge*. These species, together with more regularly distributed *Capitella capitata* and *Scoloplos marginatus*, constituted over 70% of all specimens. Total biomass value of the polychaetes varied between 3.8 and 46.4 g/sq m. *Traviska kerguelensis* and *Aglaophamus ornatus* constituted over 75% of total biomass. Species composition, richness and diversity of the polychaete assemblage varied with depth. Two parts of the investigated bottom section, differing in the polychaete assemblages structure, were distinguished: the first one in the depth range from 4-20 m and the second at the depths of 25-30 m. On the basis of both new and previously published data, two types of polychaete assemblages of the shallow soft bottom of the antarctic sublittoral were distinguished. The type of sediment seems to be the main factor influencing the composition of polychaete assemblages. (Auth.)

B-48439

Virtue, P., **Lipid composition of *Euphausia superba* Dana in relation to the nutritional value of *Phaeocystis pouchetii* (Hariot) Lagerheim**, *Antarctic science*, June 1993 5(2), p.169-177, Refs. p.176-177.

The fatty acid profiles of *Euphausia superba*, the antarctic prymnesiophyte *Phaeocystis pouchetii*, and the temperate diatom *Phaeodactylum tricornutum* were analyzed and compared. The lipid content, lipid class, fatty acid and sterol composition of *E. superba* when fed on each cultured phytoplankton and a mixed diet of both species were determined. No significant difference was found between total lipid levels of *E. superba* reared on each of these different diets. *P. pouchetii*, although deficient in a number of the essential fatty acids, is apparently an adequate food source for *E. superba*. The proportion of polyenoic fatty acids varied within lipid classes, although there was no significant difference between levels of the long chain polyunsaturate 20:5(n-3) in the total lipid of *E. superba* fed on these diets. This acid was found to be less than 1% of the total lipid in *P. pouchetii* compared to 37% in *P. tricornutum*. This suggests that krill may possess the ability to convert exogenous shorter chain fatty acids to 20:5(n-3) and 22:6(n-3). Significant differences were detected in the isomeric ratio of 16:1(n-7c)/16:0 between krill fed the diatom, compared to the prymnesiophyte diet. Significant differences were also detected in several shorter chain fatty acids and between fatty acids within their lipid classes. (Auth. mod.)

B-48455

Wynn-Williams, D.D., **Epifluorescence image analysis of the three-dimensional structure of phototrophic microbial biofilms at antarctic soil surfaces**, *Binary, computing in microbiology*, 1992 4(2), p.53-57, 11 refs.

To enhance field assessment of microbial primary phototrophic colonization, this paper describes a simple method for retrieving image data from autofluorescent microbial filaments and unicells lying outside a single plane of focus. The samples were obtained at the Jane Col fellfield study site on Signy I.

B-48474

Davison, W., Franklin, C.E., McKenzie, J.C., Carey, P.W., **Effects of chronic exposure to the water soluble fraction of fuel oil on an antarctic fish *Pagothenia borchgrevinki***, *Comparative biochemistry and physiology*, Jan. 1993 104C(1), p.67-70, 25 refs.

Antarctic fish *Pagothenia borchgrevinki* were held for 7 days in sublethal concentrations of the water soluble fraction of diesel fuel oil. These changes were noted: the fish gills produced large amounts of mucus and there was an increased frequency of coughing; haematocrit increased due to an increased number of red cells; plasma osmolarity and chloride levels did not change; and the ability of the gills to extract oxygen from the medium at low PO₂ was impaired. (Auth.)

B-48475

Knight, C.A., Driggers, E., DeVries, A.L., **Adsorption to ice of fish antifreeze glycopeptides 7 and 8**, *Biophysical journal*, Jan. 1993 64(1), p.252-259, 21 refs.

Experimental results show that fish antifreeze glycopeptides (AFGPs) 8 and 7 (with 4 and 5 repeats respectively of the Ala-Ala-Thr backbone sequence) bond onto ice prism planes aligned along a-axes, and inhibit crystal growth on prism planes and on surfaces close to that orientation. The 9.31-Å repeat spacing of the AFGP in the polyproline II helix configuration, deduced from NMR studies, matches twice the repeat spacing of ice in the deduced alignment direction, 9.038 Å, within 3%. A specific binding model is proposed for the AFGP and for the *alpha*-helical antifreeze peptide of winter flounder. For AFGP 7-8, two hydroxyl groups of each disaccharide reside within the ice surface, so that they are shared between the ice crystal and the disaccharide. This provides 24 hydrogen bonds between AFGP 8 and the ice and 30 for AFGP 7, explaining why the chemical adsorption is virtually irreversible and the crystal growth can be stopped virtually completely. The same scheme of sharing polar groups with the ice works well with the *alpha*-helical antifreeze of winter flounder, for which an amide as well as several hydroxyls are shared. The sharing of polar groups with the ice crystal, rather than hydrogen-bonding to the ice surface, may be a general requirement for adsorption-inhibition of freezing. (Auth.)

B-48476

Bandel, K., Hain, S., Riedel, F., Tiemann, H., **Limacosphaera, an unusual mesogastropod (Lamellariidae) larva of the Weddell Sea (Antarctica)**, *Nautilus*, Mar. 24, 1993 107(1), p.1-8, 14 refs.

Marseniopsis conica Smith, 1915 and *M. mollis* (Smith, 1902) have planktotrophic larvae that are unique among gastropods. They cover the larval shell with a lacunous muscular mantle that can change its volume by interaction of body fluid and muscle activity. This limacosphaera larva is found in antarctic waters, and represents the most complex larval strategy within the "echinospira group". Notes on the biology and anatomy, including histology, of this larva are presented.

B-48480

Roskov, E.G., **Brief information report on the 21st cruise of R/V Skif in shelf waters of Kerguelen Islands, fulfilled in accordance with joint Soviet-French programme (January-May 1987)** [Rapport sur la 21ème campagne du Skif (janvier-mai 1987)], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.23-29.

In accordance with an agreement on Soviet fishery in the French Economic Zone of Kerguelen Is., the R/V *Skif* carried out 258 trawlings in search of commercial aggregations of various fish species in the area. Their biomass and biological conditions were determined, and the results are discussed and presented in tables.

B-48481

Zaitsev, A.K., **Brief report on the 22nd cruise of R/V Skif to the Kerguelen Islands shelf waters under the joint USSR-France programme (June-December 1987)** [Rapport sur la 22ème campagne du Skif (juin-décembre 1987)], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.30-44.

In accordance with a French-Soviet agreement, a scientific research cruise was carried out by the R/V *Skif* in the waters around the Kerguelen Is. from June 22 to Dec. 9, 1987. Oceanographic parameters influencing the distribution, behavior and formation of fishery aggregations were investigated; the trawling survey results are presented in tables. Based on the abundance and growth rate of *Champsocephalus gunnari* and the concentration of *Dissostichus eleginoides* in the area, mass fishery dates for 1988 are set.

B-48482

Duhamel, G., **Report on the 23rd cruise of the Skif (Feb.-Mar. 1988) and the cruise of the Kalper (Apr. 1988)** [Rapport sur la 23ème campagne du Skif (février-mars 1988) et la campagne du Kalper (avril 1988)], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.45-50, In French.

Results from hydrological and ichthyological studies carried out during the 23rd cruise of the ships *Skif* and *Kalper* around the Kerguelen Is. in Feb.-Apr. 1988 are summarized as follows: the thermal and chemical water conditions were found to be comparable to those in the previous year; the surface water phytoplankton biomass was much lower in 1988 than in 1987 (185.6 versus 362.1 mg/cu m), while the number of cells was much higher (31.14 versus 19.2 cells/cu m); the biomasses of various Nototheniids observed excluded the possibility of long-term exploitation of the fish for industrial purposes.

B-48485

Ivanchenko, O.P., **Structure and quantitative development of phytoplankton in waters surrounding the Kerguelen Is.** [Structure et développement quantitatif du phytoplancton dans les eaux entourant les îles Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.73-83, 6 refs.

Qualitative composition, quantitative development, and distribution of phytoplankton in winter (July-Aug. 1987) and summer (Feb. 1987 and Feb. 1988) waters surrounding the Kerguelen Is. are discussed, based on analysis of 520 bathymetric samples collected in the upper 100 m layer. Comparative analysis of phytoplankton community populations shows changes from winter to summer, not only in the composition of the phytocenosis, but also in its quantitative indices. (Auth. mod.)

B-48486

Koubbi, P., **Macroplankton spatial distribution around the Kerguelen Is. during summer 1987-1988 and winter 1987** [Distribution spatiale des biomasses macroplanctoniques au cours des saisons estivales 1987 et 1988 et durant l'hiver 1987 dans la zone océanique des îles Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.84-89, In French.

Statistical analysis of data collected on board the *Skif* shows that macroplankton biomasses around the Kerguelen Is. are significantly greater during the summer season than during winter. In addition, increased primary productivity was observed in summer 1988 when

compared to summer 1987. The collection of data is described, and tabulated results are presented.

B-48487

Semelkina, A.N., **Development of zooplankton in the Kerguelen Is. area in 1987 and 1988** [Développement du zooplancton dans la région des îles Kerguelen au cours des années 1987 et 1988], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.90-103, 9 refs.

Some primary material is presented on seasonal and interannual variations in zooplankton populations, collected on the Soviet-French expedition in the Kerguelen Is. region in Feb., Apr., July, Aug. of 1987 and in Feb. 1988. In Feb. 1987, representatives of the tropical fauna were present in the plankton. Plankton biomass in the 0-100 m layer averaged 79 mg/cu m, which was less than 1/3 of its value in Feb. 1988 (271 mg/cu m). Copepod maximum occurred in summer, euphausiids and hyperiids showed peak values in autumn, and mollusks in winter. The seasonal dynamics of the plankton was recognized as manifesting itself by horizontal and vertical redistribution of dominant animal species and groups, while the interannual dynamics featured, in addition, diversity in the taxonomic composition. (Auth. mod.)

B-48488

Pakhomov, E.A., **Macroplankton of waters surrounding the Kerguelen Is.** [Macroplancton des eaux environnant l'archipel Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.104-112, 8 refs.

From the analysis of samples collected in shelf waters of the Kerguelen Archipelago during the joint Soviet-French expedition in Feb. 1988, 38 species and taxonomic groups of macroplankton have been identified. Among these, the following dominated: *Euphausia vallentini*, *Thysanoessa* spp., *Parathemisto gaudichaudii*, Chaetognatha, and *Salpa thompsoni*. The average numbers and biomass of the macroplankton were 157 individ./sq m and 3.2 g/sq m, respectively. The intra- and interannual variations in the macroplankton quantitative values were also investigated. A cause for these fluctuations is suggested. (Auth. mod.)

B-48489

Koubbi, P., **Fish eggs, larvae and juveniles present in the plankton of the waters around the Kerguelen Is.** [Oeufs, larves et juvéniles de poissons présents dans le plancton de la zone océanique entourant les îles Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.113-126, In French. 16 refs.

Spatial and vertical distribution, and the hydrological influence on populations of various species of Myctophidae and Notothenioidei collected around the Kerguelen Is., are described. The very few juveniles and larvae of the families Congiopodidae, Muraenolepididae, Macrouridae, Bothidae and Paralipidae found in the area are briefly discussed. Results concerning sample characteristics, density of each taxon, and their respective cartographies are presented in annexes 24-44 at the end of the volume in which this article appears.

B-48490

Piatkowski, U., **Preliminary list of cephalopods from surface waters surrounding the Kerguelen Is., Feb. 1987-Mar. 1988** [Liste préliminaire des céphalopodes des horizons océaniques superficiels entourant les îles Kerguelen collectés pendant les campagnes du *Skif* (février 1987 à mars 1988)], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.127-134.

Kerguelen cephalopod paralarvae, found in the Bongo plankton samples of the *Skif* cruises 1987 and 1988, were identified and measured (mantle length in mm). Five tables are presented, one for each cruise, showing station number, species identified and mantle length. The most abundant species present in the catches was *Brachioteuthis riisei*; its dorsal mantle/tentacle length relationship was established. Brief comments are offered on the 3 other species collected.

B-48491

Melnikov, Y.S., **Account of the results of investigations on board the Soviet research vessels *Skif* and *Kalper* in waters of the Kerguelen Is. for the period of Feb. 1987-Apr. 1988** [Exposé des résultats des recherches effectuées à bord des navires soviétiques *Skif* et *Kalper* dans les eaux entourant les îles Kerguelen au cours de la période février 1987-avril 1988], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.137-193, 22 refs.

Data obtained during ichthyological investigations on board the ships *Skif* and *Kalper* in Kerguelen waters are summarized. They provide information on the availability and density of fish concentrations and spatial distribution, length and weight of the specimens. The fish gonad conditions, degree of stomach fullness, and food ranges at the time of the catch are described and shown in tables.

B-48492

Duhamel, G., **Fish species distribution, abundance and biology in Kerguelen waters, 1987-1988** [Distribution, abondance et principales caractéristiques biologiques des espèces de la ZEE des îles Kerguelen en 1987 et 1988], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.194-251, In French. 16 refs.

During the 1987 and 1988 trawling expeditions of the ships *Skif* and *Kalper* in waters of the Kerguelen Plateau, a study was made of the biomass, geographic and vertical distribution, abundance and length of the following 6 species: *Notothenia rossii*, *Lepidonotothen squamifrons*, *Dissostichus eleginoides*, *Channichthys rhinoceratus*, *Champscephalus gunnari* and *Zanclorhynchus spinifer*. Results are discussed and presented in graphs and tables. Of all the species observed on the Plateau, the concentrations of *C. gunnari* in 1988 are described as the most noteworthy in terms of numbers and biomass.

B-48493

Roschin, E.A., **Variation of the size structure of *Champscephalus gunnari* in Kerguelen waters, 1987-1988** [Variation de la structure en taille de *Champscephalus gunnari* dans les eaux des îles Kerguelen pendant la période 1987-1988], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.252-265, In French.

Based on trawling expeditions in waters surrounding the Kerguelen Is., *Champscephalus gunnari* concentration, distribution and length differences were recorded for 3 different periods: Feb.-Apr. and Aug.-Sep. 1987, and Feb.-Apr. 1988. The largest catch and fish sizes occurred in 1988.

B-48494

Gerasimchuk, V.V., **State of *Champscephalus gunnari* stocks in shelf waters around the Kerguelen Is.** [Etat des stocks de *Champscephalus gunnari* sur le plateau des îles Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.266-276, 14 refs.

An analysis is presented of data collected over the years on the dynamics of *Champscephalus gunnari* catches in Kerguelen Is. shelf waters. The size composition, position and spawning areas, and locations of aggregations are discussed and illustrated. It is concluded that the considerable interannual variations observed in *C. gunnari* biomass and abundance in the study area are due to environmental conditions, i.e. biotic and abiotic development of food base.

B-48495

Tankevich, P.B., **Feeding of *Notothenia rossii* on the Kerguelen Is. shelf** [Sur le régime alimentaire de *Notothenia rossii* du plateau de îles Kerguelen], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.277-284, 10 refs.

Feeding of *N. rossii* is characterized by analysis of materials collected by Soviet-French expeditions in the Economic Zone around the Kerguelen Is. (1987-1988). Quantitative characteristics are presented, and qualitative food composition of the adult part of the population living outside the territorial waters is studied. It is shown that macrozooplankton and *Champscephalus gunnari* are the main prey items. (Auth.)

B-48496

Duhamel, G., Hulley, P.A., **Meso- and bathypelagic ichthyofauna** [Ichthyofaune méso et bathypélagique], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.285-295, In French. 7 refs.

Two trawling methods and equipment, deployed in Kerguelen Is. waters in 1988 by the ship *Skif* in the capture of bathypelagic and mesopelagic species, are described. Analyses of stomach contents led to the identification of 18 species, which are listed in tables along with data obtained during previous investigations, and discussed. The biogeographic significance of the family Myctophidae, as a tracer of hydrobiological conditions in the Kerguelen Is., is noted.

B-48497

Duhamel, G., Piatkowski, U., **Squid trawling around the Kerguelen Is., their abundance and role** [Calmars capturés au chalut autour des îles Kerguelen et remarques sur leur abondance et leur rôle], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.299-305, In French. 6 refs.

The study of a collection of cephalopod species, 4 of which were captured during the 1987 and 1988 trawling expeditions of the ships *Skif* and *Kalper* in the Kerguelen benthopelagic waters 150 and 420 m deep, is reviewed. It is concluded that *Moroteuthis ingens* from

the shelf and near-shore waters of Kerguelen Is., *Brachioteuthis riisei* from the epipelagic zone, and *Histioteuthis eltaninae* from the continental slope play a significant role in the islands' ecosystems.

B-48498

Robineau, D., **Cetaceans sighted on board the ships *Skif* and *Kalper* (Feb.-Apr. 1988)** [Cétacés observés à bord des navires *Skif* et *Kalper* (février-avril 1988)], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.306-307, In French. 1 ref.

Comments on 4 species of cetaceans sighted around the Kerguelen Is. are presented, along with a table showing name of species, date of sighting, coordinates, depth, and number sighted.

B-48501

Aptroot, A., Van der Knaap, W.O., **Lichen flora of Deception Island, South Shetland Islands, Nova Hedwigia**, Feb. 1993 56(1-2), p.183-192, 8 refs.

An expedition of the Dutch Arctic Centre to Deception I. yielded 70 lichen species. Thirty-three species are new records for the island or for the antarctic region. Many species were found on anthropogenous substrates belonging to an abandoned whaling station, including wood and iron. About half of the lichen flora belongs to the widespread temperate to arctic element. The other half is restricted to the antarctic region. (Auth.)

B-48505

Huntley, M.E., Escritor, F., **Ecology of *Metridia gerlachei* in the western Bransfield Strait, Antarctica, Deep-sea research**, June 1992 39(6A), p.1027-1055, 57 refs.

The population dynamics, distribution, abundance and feeding behavior of *M. gerlachei* Giesbrecht were studied in the western Bransfield Strait in the period from mid-Dec. 1986 through late Mar. 1987. The greatest abundance of all copepodite stages was found in the Gerlache Strait and in the Bransfield Current, approaching an average abundance of 500 individuals (ind.)/cu m in the upper 200 m. However, much of the population occurred below 200 m, where it sometimes approached 1000 ind./cu m at certain depths. Feeding rates on phytoplankton, determined from analysis of gut pigments and gut evacuation rate, suggest that daily rations may average between 25 and 50% body carbon/day throughout the spring and summer. A strong diel cycle was observed in grazing rate. Cluster analysis of cephalothorax length-frequency distributions, based on measurements of approximately 10,000 individual CIV and CV copepodids, shows that the largest individuals consistently occurred in phytoplankton-rich nearshore regions, whereas the smallest individuals occurred in phytoplankton-poor offshore areas. Shipboard experiments demonstrated that *M. gerlachei* CVI females feed on the eggs of another abundant antarctic copepod, *Calanoides acutus*. Spawning appears to take place before December; as many as two or three generations may be produced during the summer before the last spawning period in January. (Auth.)

B-48508

Todd, F.S., **Polar penguin mating game, Ocean realm**, Fall 1991 p.73-83.

Shore-based antarctic-breeding penguins capitalize on a brief summer period when food is seemingly limitless, but the birds must work very rapidly to successfully complete a reproductive cycle. The emperor has shifted to winter breeding on the annual fast ice and fledges the smallest-sized young of any penguin. Conversely, the king penguin takes advantage of milder climatic conditions, stretches out its rearing period, and consequently is able to fledge nearly adult-sized young. However, because of its prolonged fledging period, the king is capable of rearing only two chicks within a three-year period, while both the emperor and long-tailed penguins are annual breeders.

The unusual breeding strategy employed by the emperor penguin is not only significantly different from that of the other polar-breeding penguins, it is not even remotely similar to that of its closest relative, the king penguin, or any other bird for that matter. Nevertheless, while the various penguin breeding techniques are strikingly different, all are equally successful in the long run. (Auth.)

B-48509

Ashbolt, N.J., **Biotechnology in the Antarctic—a unique source of microorganisms**, *Genetic engineer and biotechnologist*, 1991 11(2), p.19-22, Refs. p.21-22.

Antarctica offers a range of extreme habitats where microorganisms dominate, but life is contained under the dual limitations of cold and high salinity. Many antarctic ecosystems are extreme, and therefore may not only contain unusual microorganisms, but also a plethora of potential products for biotechnology, all in what must be one of the most spectacular laboratories on earth. This paper reviews the unusual habitats and untapped potential Antarctica may hold for biotechnology. (Auth.)

B-48510

Nichols, P.D., Franzmann, P.D., **Unsaturated diether phospholipids in the antarctic methanogen *Methanococcoides burtonii***, *FEMS microbiology letters*, 1992 Vol.98, p.205-208, 18 refs.

The antarctic methanogen *Methanococcoides burtonii* contains only diether phospholipids. These membrane components were analyzed by gas chromatography and gas chromatography mass spectrometry. Of particular interest was the occurrence of unsaturated diether lipids in *M. burtonii*; unsaturated ether lipids accounted for 57% of the diether phospholipids. To the authors' knowledge, unsaturated ether lipids have not been previously reported in a methanogen. The presence of the unsaturated ether lipids in *M. burtonii* is probably the result of temperature adaptation by the bacterium. It may be possible to use these components as a chemical signature for methanogens in antarctic and southern ocean environments. (Auth.)

B-48528

Franklin, C.E., Davison, W., McKenzie, J.C., **Role of the spleen during exercise in the antarctic teleost, *Pagothenia borchgrevinki***, *Journal of experimental biology*, 1993 Vol.174, p.381-386, 20 refs.

The present study concentrates on the contribution of the spleen to the massive increase in haematocrit (Hct) during strenuous exercise in *Pagothenia borchgrevinki*. Borchs (*P. borchgrevinki*) (body mass 75.0 ± 15.6 g, mean ± standard deviation, N=40) were caught over deep water, using a baited hook and line, through holes cut in the sea ice off McMurdo Sound. The significance of the increase in Hct and thus oxygen-carrying capacity of the blood was very apparent in fish with ligated spleens. No fish completed the exercise regime, the animals quickly becoming exhausted once the highest speed had been achieved. At this highest speed, intermittent use of the myotome suggested that the pectoral red muscle fibers were working at maximum capacity, requiring a high, constant supply of oxygen.

B-48529

Buchholz, F., Vetter, R.A.H., **Enzyme kinetics in cold water: characteristics of N-acetyl-beta-D-glucosaminidase activity in the antarctic krill, *Euphausia superba*, compared with other crustacean species**, *Journal of comparative physiology B*, Feb. 1993 163(1), p.28-37, 24 refs.

N-acetyl-beta-D-glucosaminidase, a chitin-degrading enzyme, is highly active in the integument and digestive tract of euphausiids. The enzyme was used as a model to compare temperature-dependent enzymatic parameters of krill, *Euphausia superba*, with those of a

euphausiid species (*Meganyctiphanes norvegica*) found in both the Scandinavian Kattégat and the Mediterranean. Other species examined were an antarctic isopod, *Serolis polita*, and a tropical crab, *Ocypode ryderi*. Apparent Michaelis constants showed minima at ambient water temperatures (total range: 0.1-0.6 mol/l). Potentially, enzyme variants play a role in acclimatization regulated by Michaelis constants. Apparently, the rate-limiting effects of polar temperatures are partly compensated in the antarctic crustaceans by construction of enzymes with substrate affinities similar to those of species from warmer climates. The significance of apparent Michaelis constants in evaluating mechanisms of metabolic cold compensation is discussed. (Auth. mod.)

B-48530

Culik, B.M., Wilson, R.P., **Energetics of under-water swimming in Adélie penguins**, *Journal of comparative physiology B*, 1991 161(3), p.285-291, Refs. p.290-291.

The energy consumption of Adélie penguins while at rest in water (8.4 W/kg at 4 °C) or swimming below the surface was determined using a 21 m long canal fitted with respiration chambers at each end. Penguins chose to swim 86% of the time at speeds recorded in nature. Cost of transport was lowest (7.9 J/kg/m) at 1.7-2.3 m/s, corresponding to a power input of 15.8 W/kg, and only 50% as high as previously reported. Assuming a muscle efficiency of 0.25, propulsion efficiency is 0.4 and overall efficiency is 0.1. Calculated food requirements vary between 1060 g krill per adult and foraging trip at the beginning of the breeding season and 2500 g at the period of highest demand, prior to crèching of the chicks. (Auth.)

B-48531

Baublis, J.A., Wharton, R.A., Jr., Volz, P.A., **Diversity of micro-fungi in an antarctic dry valley**, *Journal of basic microbiology*, 1991 31(1), p.3-12, Refs. p.10-12.

The fungal microflora of the Taylor Valley was investigated. Samples were collected from introduced objects such as a mummified penguin and spent chewing tobacco in addition to the sparse soil found in rock fissures, isolated moss colonies, shoreline deposit materials, CaCO₃ precipitates, and microbial mat debris obtained from the frozen surface of the lake in the basin of Taylor Valley. Using conventional media and techniques, all collection sites yielded populations of yeasts and filamentous fungi. Water samples and live microbial mats from beneath the lake ice yielded species of fungi along with an abundance of bacteria. (Auth.)

B-48577

Marschoff, E., **Principal species and fishing areas** [Principales especies y áreas donde se concentrarían las actividades], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.133-139, In Spanish.

A review is presented of some characteristics, geographic distribution, and exploitation possibilities of whales, penguins, seals, krill and fish. The fish species considered to be commercially significant include *Notothenia rossi*, *N. gibberifrons*, *N. squamifrons*, *Patagonotothen brevicauda guntheri*, *Champsocephalus gunnari*, *N. larseni* and *N. nudifrons*.

B-48578

Marschoff, E., **Future prospects for the exploitation of antarctic marine living resources** [Perspectivas futuras de la explotación de recursos vivos marinos antárticos], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.141-148, In Spanish.

The future of antarctic fisheries is examined in the light of political and economic factors and the objectives of resource management as established by CCAMLR.

B-48601

Hoshiai, T., ed, NIPR Symposium on Polar Biology, 14th, Tokyo, Dec. 4-5, 1991, **Proceedings of the NIPR Symposium on Polar Biology, No.6**, Tokyo, National Institute of Polar Research, 1993, 189p., Refs. passim. For selected papers see B-48602 through B-48611, B-48613 through B-48615 and J-48612.

This volume is a compilation of 17 full length papers and 9 abstracts (including extended abstracts), 14 of which are pertinent to Antarctica. The Symposium highlighted marine prey and predator interaction and the terrestrial biology on King George I. The program of the Symposium and an author index conclude this volume.

B-48602

Ishiyama, M., Hiromi, J., Tanimura, A., Kadota, S., **Abundance and biomass distribution of microbial assemblages at the surface in the oceanic province of antarctic ocean**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.6-20, Refs. p.18-20.

During the JARE-32 cruise, bacterioplankton, autotrophic and heterotrophic nanoplankton (2-20 microns in length), and microzooplankton (15-250 microns in length) were collected from the surface of the Indian Ocean. The average abundance of bacterioplankton was 45,600 cells/ml, and the biomass was 0.25 mg C/cu m. The values of the autotrophic nanoplankton were 500 cells/ml and 2.27 mg C/cu m, respectively. There were 102 cells/ml of heterotrophic nanoplankton in abundance, and its biomass was 0.71 mg C/cu m. About 30% of the biomass of this assemblage was choanoflagellates. Average abundance and biomass of the microzooplankton were 1620 inds./l and 3.78 mg C/cu m, respectively. A large portion of the abundance and biomass of microzooplankton was oligotrichs. Protozoans within micro-sized (15-250 microns) category which ingest prey similar to or larger than themselves were found where biomass ratio of nanoplankton to microzooplankton was low (<0.3). This may indicate adaptability of the protozoan to a severe food environment. The biomass (log-scale) decreased linearly with increasing individual body weight (log-scale) with a slope of -0.21. Results suggest that smaller protozoans such as heterotrophic nanoplankton and oligotrichs have an important role in the antarctic ocean's energy flow. (Auth.)

B-48603

Cooper, J., Wilson, R.P., Adams, N.J., **Timing of foraging by the wandering albatross *Diomedea exulans***, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.55-61, Refs. p.60-61.

Deployment of devices which record timing and magnitude of food ingestion in two wandering albatrosses *Diomedea exulans* at subantarctic Marion I. shows that feeding occurred both at night and during the day, but with most ingestion events (70%) occurring during daylight hours. Seventy-six percent of the estimated mass of food was ingested during the day. Earlier workers concluded that foraging occurred mostly during the night. It is suggested that nocturnal foraging represents mostly capture of live prey close to the water surface. Daytime foraging is suggested to be mainly for moribund prey that has floated to the surface. Duration of foraging trips and timing of arrival back at the nest are similar to those reported elsewhere. The arrival of females soon after dawn is considered to be a consequence of a reluctance to land on the island at night. Differences in the temporal pattern of male and female arrivals may reflect sex-specific foraging patterns. (Auth.)

B-48604

Kerry, K.R., Clarke, J.R., Else, G.D., **Use of an automated weighing and recording system for the study of the biology of Adélie penguins (*Pygoscelis adeliae*)**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.62-75, 10 refs.

A system that automatically weighs, identifies and determines the direction of penguins moving between their breeding colony and the sea is described. Data obtained from it for a complete colony (589 nests from which 412 chicks were fledged) and related to the foraging ecology of the Adélie penguin are presented for the period from hatching to fledging. These were obtained at Béchervaise I. (total Adélie penguin population 1816 nests) near Mawson Station during the 1991/92 breeding season. The system logged more than 80,000 penguin crossings over a period of three months. Results show that from hatching (Dec. 20-Jan. 10) onward males and females deliver a similar mass of food to the chick per visit despite males being approximately 480 g (11.5%) heavier when empty. A mass of 45 kg was delivered to the colony for each chick raised to fledging. The average fledging weight was 3.1 kg. The value of the system for large-scale data collection in long-term monitoring and biological studies is discussed. (Auth.)

B-48605

Noda, K., **Heavy metal distribution in Weddell seals (*Leptonychotes weddellii*) from the Antarctic during JARE-32**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.76-83, 14 refs.

Concentration of heavy metals in 5 Weddell seals captured in 1990-91 during JARE-32 were determined. Fe and Cu concentrations in the liver of Weddell seals were notably higher than in those of other marine mammals, while Cd levels in the livers were rather lower. Markedly high Fe concentrations in the liver of Weddell seals might be related to the excellent diving ability of this species. Relatively lower Cd concentration in the liver of these seals suggests less feeding on squids which contain high Cd levels compared to fish. (Auth.)

B-48606

Matsumoto, G.I., Ohtani, S., Hirota, K., **Biogeochemical features of hydrocarbons in cyanobacterial mats from the McMurdo Dry Valleys, Antarctica**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.98-105, 15 refs.

Hydrocarbons in 9 cyanobacterial mat samples from the Labyrinth ponds and Lake Canopus of the McMurdo Dry Valleys were studied to clarify their features in relation to source organisms and biogeochemical significance. The major hydrocarbons in cyanobacterial mats were all alkenes. These hydrocarbons are mainly produced by cyanobacteria, such as *Phormidium* spp. which are major organisms of the cyanobacterial mats. The predominance of alkenes is probably due to the influence of extremely low air temperatures in Antarctica. Cyanobacterial mats may be important sources of organic components in lakes and ponds in the McMurdo Dry Valleys and other inland aquatic environments in Antarctica. (Auth mod.)

B-48607

Inoue, M., **Floristic notes on lichens in the Fildes Peninsula of King George Island and Harmony Cove of Nelson Island, South Shetland Islands, the Antarctic**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.106-120, Refs. p.118-120.

Floristic interests of lichens on the Fildes Peninsula of King George I. and Harmony Cove of Nelson I. belonging to the maritime

antarctic zone are mentioned. The total number of species occurring in the region is discussed and compared with the estimates of previous authors. Preliminary contributions to a phytogeography are discussed. The lichens found in the area are classified into 3 major groups by their distribution patterns: species known only from the maritime Antarctic; species often reported from the maritime Antarctic, but hardly known in the continental Antarctic; and species known to occur in the maritime and continental Antarctic. The distribution of 4 species not belonging to these major groups is briefly discussed. (Auth.)

B-48608

Kanda, H., Okada, H., **Chromosome study on the submerged moss collected from antarctic lakes**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.121-125, 31 refs.

Submerged moss which was found on lake beds in the Showa Station area was studied karyologically and taxonomically. The chromosome number of the moss is $n=23$, and is expressed as $n=22+m$ because it has the smallest chromosome with negative heteropycnosis. It may be appropriate to assign this moss to *Leptobryum pyriforme* (Hedw.) Wils., judging from the chromosome number in addition to some morphological features such as sexuality and tubers. (Auth.)

B-48609

Janiec, K., **Freshwater micro- and meiofauna of Admiralty Bay, King George Island, South Shetland Islands**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.133-138, 21 refs.

Species composition was studied at the water-sediment interface in various water bodies in the vicinity of Arctowski Station. The highest density of fauna was noted in moss banks, of which 75% were Bdelloidea, whereas the lowest was observed in running waters. Monogononta species occurred in nearshore ponds, with a large number of taxa and comparably high density. Among rotifers, Bdelloidea and *Notholca salina* of Monogononta were the most abundant. (Auth.)

B-48610

Utsugi, K., Ohyama, Y., **Antarctic Tardigrada III. Fildes Peninsula of King George Island**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.139-151, 15 refs.

To survey antarctic tardigrade fauna, the authors examined specimens from King George I. from Dec. 1989 to Feb. 1990. Samples composed of blue-green algae, mosses and lichens were collected from 17 sites around the Great Wall Station. Eleven species of tardigrades were found in 42 samples. Five of these species were obtained from the various sites in this study and have also been found in other antarctic areas such as Showa Station, Molodezhnaya and Mt. Riiser-Larsen. However, the 6 species *Amphibolus volubilis*, *Isohypsibius asper*, *Isohypsibius papillifer*, *Hexapodibius* sp., *Hypsibius* sp. and *Echiniscus* sp. were rare in the samples collected. (Auth.)

B-48611

Russell, S., Smith, R.I.L., **New significance for antarctic biological collections and taxonomic research**, NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.152-165, Refs. p.163-165.

Collections of preserved terrestrial and freshwater plants and animals, made since the earliest expeditions to the Antarctic and Suban-

tartic, have been the basis of our understanding of the biological composition of individual areas as well as of ecosystems in general. Representative collections of antarctic organisms and the databases of ecological information associated with them are also vital for environmental management initiatives and the formulation of conservation policy in Antarctica. In the face of increasing scientific, logistic and tourist activity in the Antarctic and Subantarctic, protection of sensitive biota and ecosystems and control of human impacts are new imperatives recognized by the Antarctic Treaty under the Protocol on Environmental Protection. The work of the British Antarctic Survey (BAS) Resource Centre is highlighted and a summary of information on the BAS plant collections and computer database is given. The value of electronic datalinking between institutions with antarctic collections is assessed, and the potential of Geographical Information Systems as frameworks for antarctic biological databases is also discussed. (Auth. mod.)

B-48613

Shaughnessy, P., Goldsworthy, S., **Feeding ecology of southern fur seals (*Arctocephalus* spp.) and their management at Heard and Macquarie Islands**. (Extended abstract), NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.173-175, 5 refs.

At Heard I., pups of the antarctic fur seal increased at an annual rate of 23% between 1963 and 1988. For 1987-1988 the number of pups was estimated to be 248. At Macquarie I., 3 species of fur seal are found: *A. gazella*, *A. tropicalis* and *A. forsteri*. Pups were first recorded in 1954-1955; their numbers have been increasing at an annual rate of 10.5%; 68 of three species were born in 1990-1991. The seals at both islands feed predominantly on pelagic myctophid fish. This is in marked contrast to *A. gazella* at South Georgia, which feed almost exclusively on antarctic krill. Heard I. is managed by the Australian Antarctic Division as an Australian External Territory; Macquarie I. is managed by the Tasmanian government as a nature reserve. Both managements provide protection to the fur seals on the islands.

B-48614

Imura, S., Higuchi, M., Kanda, H., Iwatsuki, Z., **Vegetative reproduction of mosses in soil around the antarctic moss community**. (Extended abstract), NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.179-181.

The soil samples around or beneath moss colonies were cultured to examine the modes of settlement and dispersal of mosses in Antarctica. The study site was in Skarvsnes, East Antarctica. The moss community was composed of two species, *Bryum pseudotriquetrum* and *Ceratodon purpureus*. The colonies of *C. purpureus* were predominant over all the study site. Those of *B. pseudotriquetrum* were less abundant, but loosely scattered in the study site. As a result of cultivation, many juvenile shoots of mosses developed on all the soil samples studied. Most of the juvenile shoots were *B. pseudotriquetrum* and *C. purpureus*, both constituting the moss community in the study site. The juvenile shoots of *C. purpureus* were more numerous than those of *B. pseudotriquetrum*, but *B. pseudotriquetrum* developed from almost all soil samples. In addition to these two species, small numbers of *Bryum argenteum* were also observed. (Auth. mod.)

B-48615

Shimada, K., Pan, C.X., Ohyama, Y., **Unstable cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* during the austral summer at King George Island**. (Extended abstract), NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.182-184, 6 refs.

The present survey demonstrated that inoculative freezing was effective below -20 °C in reducing the supercooling ability of oribatid mites but less effective at higher temperatures at which spontaneous freezing occurred preferentially. Thus it is suggested that the unstable supercooling ability of the mites is mainly attributed to the dietary constituents which often nucleate the ice. At the Great Wall Station, the daily minimum air temperatures sometimes dropped to subzero temperatures which are very close to the supercooling points of active mites, suggesting that these detritivorous mites are occasionally exposed to the hazard of freezing.

B-48617

Inoue, M., *Buellia subfrigida* sp. nov. (Lichens, Buelliaceae) from Lützow-Holm Bay area and Prince Olav Coast, East Antarctica—The asexual sorediate species forming a species pair with *B. frigida* Darb, *Antarctic record*, Mar. 1993 37(1), p.19-23, 11 refs.

Buellia subfrigida n. sp. growing on rocks in seasonally inundated habitats at Lützow-Holm Bay and the Prince Olav Coast is described. Except for the presence of the sorediate thallus, it is morphologically and chemically similar to *B. frigida* which is widely distributed in the continental Antarctic. Both species may form a "species pair"; *B. subfrigida* seems to be derived from sexual *B. frigida* by the acquisition of "asexual propagules" soredia. Descriptions including taxonomic and chemical data are provided. (Auth.)

B-48621

Watanabe, K., Sasaki, H., Fukuchi, M., **Report on Japan-Australia collaborative research on marine biology in the Prydz Bay area, Antarctica in 1992**, *Antarctic record*, Mar. 1993 37(1), p.103-114, In Japanese. 2 refs.

A joint project of the Australian Antarctic Division and the National Institute of Polar Research, to investigate biological processes in Prydz Bay and the coastal ice-covered areas, titled "The production and fate of biogenic particles in the antarctic marine ecosystem", was carried out during the 6th cruise of the *Aurora Australis* from Jan. 9 to Mar. 27, 1992. The main objectives of this research were: to investigate seasonal variations in the primary and secondary production and sinking processes of the products throughout the year with moored instruments, and to estimate the contribution of different components to the production and sinking processes of lower trophic organisms. For these objectives, time-series sediment traps with an *in situ* chlorophyll recorder and current meters were deployed, and water collections, plankton-net samplings and incubation experiments were carried out in the Prydz Bay area. The feeding selectivity of antarctic krill, a dominant primary consumer in the southern ocean, was preliminarily investigated by a simple electrophysiological method. (Auth. mod.)

B-48625

Park, T., **Calanoid copepods of the genus *Euaugaptilus* from antarctic and subantarctic waters**, *American Geophysical Union. Antarctic research series*, Jan. 29, 1993 Vol.58, Biology of the antarctic seas 22, p.1-48, Refs. p.47-48.

A systematic study was made of the calanoid copepod genus *Euaugaptilus* found in Isaacs-Kidd midwater trawl and Bongo plankton net samples taken in antarctic and subantarctic waters. A total of 303 adult copepods representing 14 species of *Euaugaptilus* were found, including 5 new species (*E. hadrocephalus*, *E. perasetosus*, *E. aliquantus*, *E. brevirostratus*, and *E. austrinus*) and 7 new records (*E. maxillaris*, *E. nudifrons*, *E. bullifer*, *E. gibbus*, *E. angustus*, *E. laticeps*, and *E. oblongus*). *E. antarcticus* (Wolfenden) is restored from synonymy. All species are characterized with pertinent descriptions and illustrations. Keys are presented for identification of the species. (Auth.)

B-48626

Wasmer, R.A., **Pelagic shrimps (Crustacea: Decapoda) from six USNS *Eltanin* cruises in the southeastern Indian Ocean, Tasman Sea, and southwestern Pacific Ocean to the Ross Sea**, *American Geophysical Union. Antarctic research series*, Jan. 29, 1993 Vol.58, Biology of the antarctic seas 22, p.49-91, Refs. p.85-91.

Twenty-five species of pelagic shrimps representing 12 genera from 5 families are reported from the southeastern Indian Ocean south of Australia, the Tasman Sea, and the southwestern Pacific Ocean south of New Zealand to the Ross Sea. Of these, *Pasiphaea burukovskyi* is described as a new species. Three species, (*Sergia laminatus*, *Sergia scintillans*, and *Pasiphaea balssi*) are new to the known shrimp fauna of the region. Broad distributional patterns of the shrimps in relation to subtropical, subantarctic, and antarctic waters are discussed. (Auth.)

B-48627

Kudenov, J.D., **Amphinomidae and Euprosinidae (Annelida: Polychaeta) principally from antarctica, the southern ocean, and subantarctic regions**, *American Geophysical Union. Antarctic research series*, Jan. 29, 1993 Vol.58, Biology of the antarctic seas 22, p.93-150, Refs. p.146-150.

In all, 15 species of amphinomid and euprosinid polychaetes are reported from collections taken primarily by the U.S. Antarctic Research Program sponsored cruises to antarctic and subantarctic waters. A new genus and 9 new species are described as follows: Amphinomidae: *Chloeia australis*; Euprosinidae: *Euprosine abyssalis*, *E. antarctica*, *E. armata*, *E. echidna*, and *E. monroi*, and *Euprosinopsis* new genus: *Euprosinopsis antipoda*, *E. crassiseta*, and *E. horsti*. The amphinomid genus *Brachamphinome* Hartman, 1967, the euprosinid genera *Euprosine* Lamarck, 1818 and *Euprosinella* Detinova, 1985, and the species *Brachamphinome antarctica* are emended; lectotypes and paralectotypes are designated for the latter species. Previous records and the endemism of the order Amphinomida from Antarctica are discussed; a preliminary systematic scheme modified from Horst [1903] is given for all described species as *Euprosine*, *Euprosinella*, and *Euprosinopsis*, and a key to all known species of antarctic amphinomid, euprosinid, and spintherid polychaetes, considered valid, is also presented. (Auth.)

B-48628

Park, C., Wormuth, J.H., **Distribution of antarctic zooplankton around Elephant Island during the austral summers of 1988, 1989, and 1990**, *Polar biology*, May 1993 13(4), p.215-225, Refs p.224-225.

Year-to-year variation and vertical distributions of epipelagic zooplankton around Elephant I. and King George I. were examined with samples collected during the austral summers (Jan.-Feb.) of 1988, 1989 and 1990. Copepods were the major components of epipelagic zooplankton (in numbers) with dominance of *Metridia gerlachei* (1988 and 1989) and small calanoids and cyclopoids (1990). Euphausiids and salps were the next most abundant groups. The percent composition of euphausiids decreased from 1988 to 1990 while that of salps increased. The abundance of salps exceeded euphausiids and major taxa of copepods in 1990. Local patches of polychaetes and amphipods were also found. Statistically significant annual variations with increased numbers in 1990 were found by analyses of variance in total abundance, abundances of copepods, salps, chaetognaths and amphipods, but abundances of euphausiids, polychaetes and fishes showed no significant annual variations. When the study area was divided geographically, horizontal variability in abundance within each year showed no significance in total abundance, abundances of copepods, euphausiids, amphipods and fishes, but significance in salps, polychaetes and chaetognaths. (Auth. mod.)

B-48629

Sancho, L.G., Valladares, F., **Lichen colonization of recent moraines on Livingston Island (South Shetland I., Antarctica)**, *Polar biology*, May 1993 13(4), p.227-233, Refs. p.232-233.

Recent moraines constitute a worthwhile opportunity for studies concerning plant colonization, especially when the date of origin of the moraine is known. The moraine studied, roughly 34 years old, was in an early stage of plant succession. Plant communities were observed only on the boulders at the top of the moraine. They were always composed of a relatively small number of lichen species and with a low coverage of the rock surface. It is noteworthy that all lichen species observed lack asexual propagula, and most of them are considered as being nitrophilous or ornithocoprophilous. In many cases, a close relation between the boulder size and the measured variables (specimen diameter, coverage, and number of species) was noted, with maximum values for the biggest boulders. The hypothetical biological implications of the boulder size and the causes of the interspecific differences observed in the average diameter of lichens are discussed. (Auth.)

B-48630

Thompson, D.R., Furness, R.W., Lewis, S.A., **Temporal and spatial variation in mercury concentrations in some albatrosses and petrels from the subantarctic**, *Polar biology*, May 1993 13(4), p.239-244, 27 refs.

Mercury concentrations in albatrosses and some other large procellariiforms are very much higher than found in other groups of seabirds. Analysis of mercury concentrations in feather samples collected prior to 1950 and after this date showed slight, but significant, increases in three out of ten subantarctic procellariiform species. The lack of widespread and pronounced increases in mercury concentrations in procellariiforms between these periods may indicate that industrial and agricultural emissions of mercury in the Southern Hemisphere have been relatively minor and the high concentrations are predominantly due to natural processes. Mercury concentrations were relatively consistent between body feathers of individuals, and showed no variation related to adult age. Within species, mercury concentrations tended to be highest in New Zealand populations and lowest in Falkland Is. and South Georgia populations. Mercury concentrations also varied among species, but not in a way that could be related to diet. (Auth.)

B-48631

Zdanowski, M.K., Donachie, S.P., **Bacteria in the sea-ice zone between Elephant Island and the South Orkneys during the Polish sea-ice zone expedition (Dec. 1988 to Jan. 1989)**, *Polar biology*, May 1993 13(4), p.245-254, Refs. p.253-254.

During austral summer 1988/89, total bacterial Acridine Orange Direct Counts (AODC) in seawater, mean 6,000,000/l, were three to ten times lower than generally reported for the Bransfield Strait to north Weddell Sea area. In contrast, numbers of viable bacteria (Colony Forming Units, CFU), mean 10,600/l, were two to three times higher than reported. Bacterial abundance here shows large seasonal and spatial changes. On the basis of bacterial, diatom, detritus, and amino acid data from this study, two main regions were defined: 'Cold winter water' in the west with high salinity and low CFU, AODC, and other parameters. In the east, lower salinity and higher values for all parameters were found in warmer meltwater at the surface. CFU and AODC values in ice were respectively six and 85 times higher than in surrounding seawater. Taxonomic studies indicate considerable diversity in genera and nutritional requirements of isolated bacteria. Sea-ice and water column bacterial communities differed. Many isolated strains, however, were found in both habitats. Sea-ice seems to be important in regulating surrounding bacterioplankton. (Auth.)

B-48632

Wang, Z.P., Norman, F.I., **Foods of the south polar skua *Catharacta maccormicki* in the eastern Larsemann Hills, Princess Elizabeth Land, East Antarctica**, *Polar biology*, May 1993 13(4), p.255-262, 23 refs.

Regurgitated pellets and food remains were collected near nest sites, and from a club site, of south polar skuas *Catharacta maccormicki* in the eastern Larsemann Hills. The samples indicated that the snow petrel *Pagodroma nivea*, the most abundant seabird species breeding locally, formed the major dietary component, comprising some 66% of food items identified in pellets and 80% of the food remains obtained. Adélie penguins *Pygoscelis adeliae* (which do not breed in the Larsemann Hills), other seabirds, fish and marine foods were rarely found as remains or in pellets. However, refuse (meat, fish and vegetable remains) taken as food by skuas from nearby stations occurred in pellets at all sites and formed about 12% of the food remains collected and identified. In this study, foods taken by skuas were related both to the local breeding distribution of snow petrels, and to the possession of a feeding territory. (Auth. mod.)

B-48633

Cherel, Y., Fréby, F., Gilles, J., Robin, J.P., **Comparative fuel metabolism in Gentoo and King penguins: adaptation to brief versus prolonged fasting**, *Polar biology*, May 1993 13(4), p.263-269, Refs. p.268-269.

To compare fuel utilization in large birds adapted to brief or prolonged fasting, protein and lipid utilization were quantified in the Gentoo penguin and the King penguin. The inshore feeder Gentoo penguin fasts for only a few days in its colony, while King penguin chicks starve for several months in the subantarctic winter and male King penguins starve for 5-6 weeks at the beginning of their breeding cycle. After an initial decrease in both daily body mass loss and nitrogen excretion during the first days of food deprivation, these two parameters thereafter stabilized at low values. At that time, protein utilization accounted for 15% of total energy expenditure in Gentoo penguins and only 6% in King penguin chicks during winter, the remainder (85% and 94%, respectively) being provided by fat oxidation. Similar percentages in fuel metabolism as seen in chicks during winter were reached in fasting adult King penguins and spring chicks. However, a seasonal adaptation occurs in fasting chicks because energy expenditure is lower during winter. (Auth. mod.)

B-48634

Kennedy, A.D., **Photosynthetic response of the antarctic moss *Polytrichum alpestre* Hoppe to low temperatures and freeze-thaw stress**, *Polar biology*, May 1993 13(4), p.271-279, Refs. p.278-279.

The effect of low temperatures and freeze-thaw stress on photosynthetic carbon exchange in an antarctic population of the turf-forming moss species *Polytrichum alpestre* Hoppe was investigated using infra-red gas analysis. Photosynthetic recovery from freezing was found to depend on the absolute depth of low temperature experienced. Repeated freeze-thaw cycles caused a greater reduction in gross photosynthesis than constant freezing over the same period of time, suggesting that the freeze-thaw event itself, and not just cold temperatures, causes damage. The frequency of freeze-thaw events was significant: freeze-thaw cycles every 12 h inflicted more damage than freeze-thaw cycles every 24 or 48 h. Most damage occurred during the first cycle; relatively little was recorded during subsequent cycles. At +10 C, gross CO₂ flux was directly proportional to moss water content between 0.3 and 3.5 g/g dry mass. Moss samples with a low water content withstood freeze-thaw cycles to -5, -10 and -20 C better than samples with a high water content, indicating that desiccation in the field may improve survival at low temperatures. Microclimate data for field populations of *P. alpestre* at Signy I. suggest that

sub-zero temperatures and freeze-thaw stress may act as limiting factors on the species' distribution and viability, particularly when the insulating effect of snow cover is small. (Auth.)

B-48635

Thomas, D.N., Gleitz, M., **Allocation of photoassimilated carbon into major algal metabolite fractions: variation between two diatom species isolated from the Weddell Sea (Antarctica)**, *Polar biology*, May 1993 13(4), p.281-286, Refs. p.285-286.

Distribution of photoassimilated carbon into major metabolite classes differed between two antarctic diatom species, *Nitzschia curta* and a small unicellular *Chaetoceros* sp. Time course uptake studies (over 54 h) revealed that C-14 allocation appeared to be equilibrated after approximately 8 h at light saturated photosynthesis. During short-term dark periods (6 h), polysaccharides as well as low-molecular-weight compounds were catabolized to sustain protein synthesis in the dark, whilst lipid reserves were not mobilized for this process. Experiments with these two species were conducted at 0 and -1.5 C, although no difference in the distribution of radiolabel was measured between the two temperatures. It is hypothesized that under near-optimal conditions, fast growing species are characterized by high carbon turnover associated with a rapid flow of newly assimilated carbon into polymeric compound classes. On the other hand, slower growing species (such as *N. curta*) may store a significant amount of surplus carbon in the low-molecular-weight metabolite fraction. Species-specific preferences were observed when comparing the accumulation of radiolabel into the lipid pools. (Auth.)

B-48644

Simmons, G.M., Jr., Vestal, J.R., Wharton, R.A., Jr., **Environmental regulators of microbial activity in continental antarctic lakes**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.165-195, Refs. p.191-195.

Most antarctic lakes exhibit sharp chemoclines and unusual thermal profiles, and most are covered to some degree with perennial ice. The biological communities which exist in these lakes must be able to adapt to a suite of harsh environmental factors. Some of these include supersaturated levels of dissolved oxygen, extremely low light conditions on an annual basis, and thick ice covers which reduce or eliminate wind-induced internal water circulation. Perhaps one of the most unusual biological features of these lakes is the extensiveness of benthic microbial mats. These mat communities are representative of living stromatolites. The sediments which the stromatolites trap and bind provide an unusual geological record about episodic climatic events related to the wax and wane of the ice surface. Because of the intimate associations among the lakes and their surrounding terrestrial environments in terms of heat budgets, antarctic lakes may also prove to be excellent laboratories in which to study the progress of predicted global warming. (Auth. mod.)

B-48645

Jones-Lee, A., Lee, G.F., **Relationship between phosphorus load and eutrophication response in Lake Vanda**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.197-214, Refs. p.213-214.

During the summer of 1980-1981, a study was undertaken on the applicability of the Vollenweider-Organization for Economic Cooperation and Development (OECD) phosphorus loading-eutrophication response relationships to Lake Vanda, a permanently ice-covered meromictic lake. The Vollenweider-OECD empirical relationships had been developed on the basis of load-response couplings for more than 300 lakes and reservoirs around the world that have a wide range of physical, chemical, and morphological characteristics. However, the

Vollenweider-OECD empirical relationships had not been evaluated for their applicability to a body of water as oligotrophic as Lake Vanda or to one with its unusual physical and chemical characteristics. The Vollenweider-OECD phosphorus load-response models did indeed describe the relationships found for Lake Vanda when the model input was adjusted for the algal availability of the phosphorus load. Results of this study extend the range of conditions for types and trophic states of bodies of water for which the Vollenweider-OECD eutrophication models can be applied. (Auth.)

B-48656

Ishikawa, M., **Elements in tissues and organs of an antarctic fish, *Champsocephalus gunnari***, *Nuclear instruments and methods in physics research*, Apr. 1993 B75(1-4), p.204-208, 6 refs.

Elements in the tissues and organs of the fish *Champsocephalus gunnari* were analyzed by PIXE. A comparison was made with a migratory fish, the bluefin tuna *Thunnus thunnus*, and a morphologically similar fish, the brown barracuda *Sphyrna pinnatus*. High levels of Mn were found in the gills and liver of the tuna in the range of 4-10 ppm, while in the *C. gunnari*, Mn was highest in the muscle (70 ppm). Fe was found in the spleen, kidney and liver of the tuna at levels of 300, 890 and 680 ppm. In *C. gunnari*, however, levels in these organs were 40-80 ppm. A notably higher level of 302 ppm was found in the muscle. Cu was the highest in the gall-bladder of a tuna (66 ppm), while it was 13 ppm in the *C. gunnari*, but was 52 ppm in the muscle. Mn, Fe and Cu were particularly high in the muscle of *C. gunnari*. These elements may assist in oxygen fixation and transportation through cutaneous respiration. (Auth. mod.)

B-48661

Risebrough, R.W., **Chemical change in Antarctica—significance? A perspective**, *Marine pollution bulletin*, 1992 25(9-12), p.227-230, 18 refs.

The bitter confrontations of 20-25 years ago between a small environmental science community and several industries manufacturing chlorinated hydrocarbons are now only an historical footnote in the rapid evolution of an environmental consciousness. Regulations developed in industrial countries are being applied to protect the most pristine of the world's environments in Antarctica. Many of the proposed regulations, however, would serve no useful purpose; some reports of environmental damage are grossly exaggerated. A certain skepticism might be appropriate. Nevertheless, although monitoring is not a "scientific" activity, the case is made for a monitoring program in Antarctica that would measure temporal changes in the environmental levels of contaminants from both local and remote sources. (Auth.)

B-48662

Karentz, D., **Ozone depletion and UV-B radiation in the Antarctic—limitations to ecological assessment**, *Marine pollution bulletin*, 1992 25(9-12), p.231-232, 14 refs.

Ozone depletion has been detected in the upper atmosphere over the Antarctic since the late 1970s. This depletion results in increased flux of incident ultraviolet-B radiation in antarctic environments. There is considerable information available about the chemical and physical characteristics of this atmospheric phenomenon, but the ecological impact of this annual pollution cycle has not been determined. Only a few studies on the UV-photobiology of antarctic organisms have been initiated, and neither the extent of ecosystem modification nor the time scale for ecosystem response are known. (Auth.)

B-48663

Quetin, L.B., Ross, R.M., **Long-term ecological research strategy for polar environmental research**, *Marine pollution bulletin*, 1992 25(9-12), p.233-238, 16 refs.

The Palmer Long-Term Ecological Research site was established in the vicinity of Palmer Station in 1990. It is the eighteenth and most recent addition to the LTER Network funded by the U.S. NSF. The Palmer LTER expands the geographical and habitat coverage of the LTER Network to southern polar regions, and offers unique opportunities for ecological synthesis and the study of long-term ecological phenomena in the antarctic marine ecosystem. The central hypothesis of the Palmer LTER is that many significant biological processes in the antarctic marine environment are strongly affected by physical processes, particularly interannual variability in the annual extent and dynamics of pack ice and variations in ocean currents. The Palmer LTER Studies Group is multidisciplinary and seeks to understand and model interactions between key species from different trophic levels and the physical environment. It is recognized that anthropogenic impacts in Antarctica cannot be adequately evaluated without understanding the underlying natural variability in antarctic ecosystems. (Auth.)

B-48665

Draggan, S., Wilkniss, P., **Operating philosophy for the U.S. Antarctic Program**, *Marine pollution bulletin*, 1992 25(9-12), p.250-252, 7 refs.

In the early days of Antarctica's exploration, there was scant consideration among expeditioners of human impact on its environment. Today, several national programs of research in Antarctica have become regular undertakings. The time of the antarctic explorer and adventurer when rules and sanctions were scant is past. With their on-site laboratories; arrangements for accommodation; fleets of aircraft, ships, and land vehicles; and requirements for materials influx and removal, these programs possess the characteristics of "big science". As such they cannot, and do not, conduct their business as in the past. They require an overarching philosophy to guarantee compatibility with Antarctica's unique environment so as to ensure its value to future scientific investigation. (Auth.)

B-48666

Manheim, B.S., Jr., **Failure of the National Science Foundation to protect Antarctica**, *Marine pollution bulletin*, 1992 25(9-12), p.253-254, 13 refs.

The author addresses the National Science Foundation (NSF) efforts to clean up the antarctic environment and to implement the recently adopted Protocol on Environmental Protection to the Antarctic Treaty. Although NSF has taken modest steps to address certain environmental impacts from its operations in Antarctica, it misrepresents its past actions and exaggerates the extent of its commitment to environmental protection in Antarctica under the new Protocol. (Auth. mod.)

B-48669

Cripps, G.C., **Natural and anthropogenic hydrocarbons in the antarctic marine environment**, *Marine pollution bulletin*, 1992 25(9-12), p.266-273, 64 refs.

The antarctic marine environment contains a range of hydrocarbons at low concentrations, which are generally biogenic in origin. All major classes of hydrocarbons have been found in the antarctic ecosystem. At present, anthropogenic input is very low and difficult to resolve from background levels. Pollution in the Antarctic is limited to only a few sources, and although contamination can be locally chronic, it is very restricted in extent. To date there have been few studies of hydrocarbon pollution, and those available have been patchy in spatial coverage and generally lack time-series data. The low levels of natural hydrocarbons and restricted human activity make the antarctic ecosystem suitable as an indicator of global hydrocarbon pollution. (Auth.)

B-48675

Eppley, Z.A., **Assessing indirect effects of oil in the presence of natural variation: The problem of reproductive failure in south polar skuas during the *Bahia Paraiso* oil spill**, *Marine pollution bulletin*, 1992 25(9-12), p.307-312, 26 refs.

A population-wide mortality of south polar skua chicks occurred during a small diesel-oil spill at Palmer Station in 1989. It was hypothesized that sublethal oiling of adult south polar skuas temporarily disrupted parental guarding of chicks. Unattended chicks were preyed on by other skuas, and all known chicks within the local population were lost. Subsequently, other researchers have proposed that this reproductive failure was unrelated to the presence of oil. Natural variation producing food shortages or storms in critical periods occasionally may result in reproductive failure among seabirds. Here, evidence for these alternative hypotheses is examined. This controversy illuminates the general problem of determining the effects of an oil spill on natural populations, whose numbers and reproductive success vary both in time and space. (Auth.)

B-48676

McDonald, S.J., Kennicutt, M.C., Jr., Brooks, J.M., **Evidence of polycyclic aromatic hydrocarbon (PAH) exposure in fish from the Antarctic Peninsula**, *Marine pollution bulletin*, 1992 25(9-12), p.313-317, 22 refs.

PAH exposure was assessed in fish from Arthur Harbor and sites remote from human activities by measuring the concentrations of polycyclic aromatic hydrocarbon (PAH) metabolites in bile and PAH in tissues and stomach contents. The highest concentrations of biliary metabolites and tissue PAH were present in fish captured near an Argentine supply ship (*Bahia Paraiso*) that ran aground in Arthur Harbor in 1989. The presence of biliary PAH metabolites in fish collected near Palmer Station suggests low-level exposure to contaminants. However, PAH tissue concentrations in fish from Palmer Station were similar to those from remote sites. Both tissue PAH and metabolite concentrations were low in fish captured at sites remote from human activities. The confirmation of PAH metabolites in the bile of fish from Arthur Harbor is direct evidence that the presence of humans has resulted in antarctic fish being exposed to petroleum-derived PAH. (Auth.)

B-48677

Lenihan, H.S., **Benthic marine pollution around McMurdo Station, Antarctica: a summary of findings**, *Marine pollution bulletin*, 1992 25(9-12), p.318-323, 11 refs.

This review summarizes the results of 3 years of research at McMurdo Station which has documented concentrations of chemical contaminants, changes in community patterns, and the toxicity of sediments to invertebrate species and infaunal communities. The primary contaminants are petroleum hydrocarbons in the sediments of Winter Quarters Bay, the site of shipping activities and a former dumpsite. Total hydrocarbon levels in sediments in Winter Quarters Bay were comparable to the most polluted harbors in temperate latitudes. However, a steep gradient of pollution existed: stations less than 1 km away were nearly pristine. Benthic invertebrate communities changed dramatically along this contamination gradient. The results of both field and laboratory bioassay experiments with contaminated sediments found that biological changes observed in benthic communities around McMurdo Station were most likely caused by hydrocarbons, PCBs, and PCTs. A primary goal of polar pollution research is to determine the response and tolerance of antarctic biota to physical and chemical anthropogenic disturbance, and the mitigation of negative effects. (Auth. mod.)

B-48714

Wilson, R.P., **Diel dive depth in penguins in relation to diel vertical migration of prey: whose dinner by candlelight**, *Marine ecology progress series*, Mar. 31, 1993 94(1), p.101-104, 18 refs.

Diel vertical migration by zooplankton is thought to allow marine animals to exploit the more abundant food resources in the upper water strata at night while minimizing predation from optically-orienting predators. Contrary to this, consistently shallower dives at night made by marine reptiles, mammals and birds have been attributed to enhanced feeding conditions as predators exploit prey that become accessible near the surface. The authors found foraging success in penguins reduced at night and dive depth limited exclusively by ambient light levels. Consideration of foraging strategies adopted by air-breathing predators may explain typical vertical migration patterns of prey, as well as departures from them. (Auth.)

B-48715

Pigg, K.B., Taylor, T.N., **Anatomically preserved *Glossopteris* stems with attached leaves from the central Transantarctic Mountains, Antarctica**, *American journal of botany*, 1993 80(5), p.500-516, Refs. p.514-516.

Stems and buds of *Glossopteris skaarensis* Pigg and buds of *G. schopfii* Pigg, from the Permian Skaar Ridge locality in the central Transantarctic Mountains, demonstrate the first anatomically preserved glossopterids known with stem/leaf attachment. Stems of *G. skaarensis* are 1-12 mm in diameter with a broad pith, poorly defined primary xylem, and a zone of secondary xylem up to 6 mm thick. Pycnoxylic wood conforming to *Araucarioxylon* Kraus is composed of tracheids with uni- to biserate oval to hexagonal bordered pits on radial walls, uniseriate rays one to a few cells high, and cupressoid to taxodioid cross-field pitting. Buds of *G. skaarensis* have leaves with narrow lateral laminae and a thickened midrib containing a wide lacuna, delicate vascular strands, and a prominent hypodermis. In contrast, buds of *G. schopfii* have uniformly thick leaves with prominent, circular vascular bundle sheaths. These anatomical details are used to reconstruct individual types of glossopterid plants, providing new information toward understanding the ecology and evolution of this important group of Permian seed plants. (Auth. mod.)

B-48716

Hawes, I., **Photosynthesis in thick cyanobacterial films: a comparison of annual and perennial antarctic mat communities**, *Hydrobiologia*, Feb. 26, 1993 252(3), p.203-209, 18 refs.

Annual and perennial cyanobacterial mats from streams on Signy I. show similar areal concentrations of chlorophyll *a* and areal rates of photosynthesis. Maximum rates of photosynthesis were temperature-dependent over the range 0-14 C, with a Q₁₀ of approximately 2.5. Rates of photosynthesis per unit chlorophyll *a* were comparable to other antarctic mat communities, but low compared to phytoplankton from upstream lakes. Areal rates of photosynthesis were however much higher than for phytoplankton. Low chlorophyll-specific rates of photosynthesis are interpreted as the effect of self shading within the mats. It is hypothesized that these mats rapidly attenuate incoming radiation and that photosynthesis in most of the mat is effectively light-limited. This situation is likely to occur in all thick periphyton films. (Auth.)

B-48718

Van der Knaap, W.O., Van Leeuwen, J.F.N., **Recent pollen diagram from Antarctica (King George Island, South Shetland Islands)**, *Holocene*, June 1993 3(2), p.169-173, 16 refs.

A pollen diagram from King George I., South Shetland Is., is presented; it is the first from the antarctic region. A basal radiocar-

bon date indicates a calibrated age of 300 years or less. Pollen of one or both of the native vascular plants and many long-distance transported types, mainly *Nothofagus*, are present in all samples. A total of 37 long-distance transported pollen and spore types were encountered in the samples from the section and in an additional modern moss sample collected on Deception I. Changes in local vegetation are recorded. The possibilities of reconstructing past human activities and past climatic change with the help of pollen diagrams are discussed. (Auth.)

B-48719

Emschermann, P., **On antarctic entoprocta: Nematocyst-like organs in a Loxosomatid, adaptive developmental strategies, host specificity, and bipolar occurrence of species**, *Biological bulletin*, Apr. 1993 184(2), p.153-185, 77 refs.

In the southern Weddell Sea and the Bransfield Strait a total of 8 species of entoprocts were found: 4 Loxosomatidae, originally known to be common in the Northern Polar Sea and the Atlantic sector of the subarctic region; 3 new species of loxosomatids; and one single colonial entoproct which is distributed worldwide. *Loxosomella brachystipes*, described by Franzén in 1973 from South Georgia, is shown to be synonymous with *L. varians* Nielsen, 1964. A microscopic investigation of the above species revealed several morphological characters, previously unknown, that add to the knowledge of the Entoprocta in general, and also help in characterizing species. The first of these novel characters, observed in *L. brochobola* sp. nov., are extruding organs similar to cnidarian spirocysts. This is the first description of such organs in entoprocts. *Loxosomella antarctica* is capable of calyx regeneration and thereby becomes the only solitary entoproct known to have such a regeneration capacity. Finally, the formation of special resting buds in *Barentsia discreta* is described. The range of morphological variation of these species, the question of host specificity in the Loxosomatidae, and the bipolar occurrence of some of these species are discussed. (Auth. mod.)

B-48720

Mooi, R., David, B., **Novel skeletal topologies are related to birth in antarctic sea urchins**, *Académie des sciences, Paris. Comptes rendus. Série III*, Apr. 1993 316(4), p.341-345, With abridged version and abstract in French. 9 refs.

The juveniles of two species of antarctic holasteroid echinoids are protected in and born from a unique brooding system contained within the test of the female. This behavior represents the most extreme type of parental care in the *Echinoidea*. The origin of the brooding system is accompanied by dramatic changes in apical system architecture which can be resolved by comparing acular and genital plate surface area changes during ontogeny, and through shape analysis of sutural vertices in the apex of males and females. The authors discuss how these and other features might help explain the evolutionary derivation of the holasteroid brooding system from either complete innovation through modification of the "ocular plate" rule, or modification of pre-existing topologies found in other *Eleutherozoa*, but otherwise not strongly expressed in echinoids. (Auth.)

B-48735

Keage, P.L., Dingwall, P.R., **Conservation strategy for the Australian Antarctic Territory**, *Polar record*, July 1993 29(170), p.242-244.

In May 1992 the Australian Antarctic Foundation (AAF) announced its intention to sponsor the preparation of a Conservation Strategy for the Australian Antarctic Territory (AAT). Accordingly, on Feb. 8-9, 1993, the Foundation, in conjunction with the Centre for Resource and Environmental Studies (CRES) at the Australian National University in Canberra, hosted the 1993 Fenner Conference as

an open forum on the content and direction the Conservation Strategy might take. There were 115 participants at the meeting, drawn from a wide variety of government agencies, non-governmental organizations, universities, and parts of the business community. Common emergent issues, such as the call for better environmental management and greater public participation in the organization of the national antarctic program, were clearly evident from the various workshop reports. The final Conservation Strategy is due for completion in Aug. 1993.

B-48737

Scientific Committee on Antarctic Research, **SCAR bulletin No.110, July 1993**, *Polar record*, July 1993 29(170), p.256-275.

SCAR bulletin No.110 presents the full text of the Protocol on Environmental Protection to The Antarctic Treaty and the 13 Articles of Schedule to the Protocol: Arbitration. Five annexes are included, covering the 8 Articles of Environmental impact assessment, 9 Articles and 3 appendices of Conservation of antarctic fauna and flora, 13 Articles of Waste disposal and waste management, 15 Articles of Prevention of marine pollution, and 12 Articles of Area protection and management.

B-48740

Friedmann, E.I., ed, **Antarctic microbiology**, New York, Wiley-Liss, Inc., 1993, 634p., Refs. passim. For individual papers see B-48741 through B-48753, B-48755, B-48756 and H-48754.

This volume consists of 16 papers grouped under marine environments, terrestrial and freshwater environments, and other topics. The purpose of this book is to offer an account of the microbial habitats and communities that play significant roles in the ecosystem of the antarctic continent. Many of the subjects are summarized here for the first time, such as the studies by Russian researchers of microorganisms buried deep in antarctic ice.

B-48741

Karl, D.M., **Microbial processes in the southern oceans**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.1-63, Refs. p.52-63.

In this review, the author summarizes the marine antarctic microbiological research conducted since 1960, with an emphasis on studies since 1975. The focus is on microbial habitats, their associated populations, and population interactions; studies of pure cultures are discussed only where the information is relevant to the understanding of *in situ* microbial processes. For the purpose of this review, he defines *microorganism* as any small (equal to or less than 200 microns) organism or cell, so bacteria, viruses, unicellular algae, protozoans, and small metazoans are considered, but the focus is primarily on the chemoheterotrophic bacterioplankton populations.

B-48742

El-Sayed, S.Z., Fryxell, G.A., **Phytoplankton**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.65-122, Refs. p.115-122.

The study of antarctic marine phytoplankton has an almost uninterrupted history that dates back nearly a century and a half. Like any other branch of science, antarctic phytoplankton investigation has undergone several successive periods of extensive collecting and cataloguing, biogeographical survey, physiological ecology, behavioral responses of individual species, and population dynamics. Here the authors review the progress made during five periods of antarctic phytoplankton research, each operating on a different temporal and spatial scale.

B-48743

Garrison, D.L., Gowing, M.M., **Protozooplankton**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.123-165, Refs. p.156-165.

In this chapter, the authors treat the antarctic protozooplankton as a distinct assemblage of organisms spanning the size range from nanoplankton through mesoplankton and showing considerable variability in trophic mode. The ecology, and the role and importance of protozoans in antarctic waters, are described.

B-48744

Palmisano, A.C., Garrison, D.L., **Microorganisms in antarctic sea ice**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.167-218, Refs. p.210-218.

This review of the microbiology of sea-ice habitats emphasizes studies carried out in recent years. Included is background information on the ecology of sea-ice microorganisms, with older hypotheses about the relationships between ice-associated organisms and their environments, and on factors controlling biological activity and population distributions, which are still being refined. Although it is not the purpose of the authors to compare arctic and antarctic ecosystems, similar studies are being conducted in the two regions, and comparisons have been included where appropriate. In the final section, directions for future research in the field of sea-ice microbiology are discussed. These range from the wider use of remote sensing by satellites to application of state-of-the-art microprobes to the study of microhabitats of the ice community. Many of the technological advances now in wide use in lower-latitude research are slowly being incorporated into studies of polar regions.

B-48745

White, D.C., Smith, G.A., Guckert, J.B., Nichols, P.D., **Nearshore benthic marine sediments**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.219-240, Refs. p.235-240.

Antarctic benthic sediments have only recently been investigated thoroughly. Studies prior to 1980 focused simply on detecting viable microorganisms. Recent descriptive endeavors have sought to establish the basic microbial ecology of these communities. These investigations provide good quantitative information, but typically only in areas adjacent to research stations. In this chapter, the authors discuss sediment microbial biomass and distribution; community structure, metabolic activities, and carbon assimilation and allocation within microbial lipids; potential use of lipids in food-chain dynamics; use of sediment microorganisms as indicators of anthropogenous contamination; and bacterial enzymatic polymer degradation processes and rates within subantarctic regions.

B-48746

Staley, J.T., Herwig, R.P., **Degradation of particulate organic material in the Antarctic**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.241-264, Refs. p.260-264.

Ways in which antarctic degradation of particulate organic material (POM) differs from that in temperate-zone environments, where it occurs largely through the activities of either free-living microorganisms or microorganisms living in association with higher animals, are discussed. For example, cellulose decomposition occurs by the activity of free-living fungi and bacteria or by that of symbiotic microorganisms that inhabit the digestive tract of animals such as ruminants and termites. Other particulate materials such as proteins, starch or low-molecular-weight carbohydrates, and lipid are degraded in a similar fashion. In aquatic environments, animals ingest bacteria and other microorganisms along with the particulate materials they are degrading, so they become part of the planktonic microbial loop.

B-48747

Abyzov, S.S., **Microorganisms in the antarctic ice**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.265-295, Refs. p.290-295.

The method and instruments used in microbiological studies in ice cores from the Vostok Station between 1974 and 1989 are described. The discussion covers the frequency of viable microorganisms at various depths of the ice sheet and the types of viable microflora found. It is suggested that fungal spores, and especially bacterial spores, are able to survive for many thousands of years; the latter have been found in the very oldest layers studied.

B-48748

Vishniac, H.S., **Microbiology of antarctic soils**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.297-341, Refs. p.329-338.

The heterotrophic soil microbiota of the antarctic region falls into two major categories distinguished by the presence or absence of vegetation. Much of this review, which excludes the microbiota of soils heated by volcanism, consists of a recital of microbial taxa. This recital is necessary for assessing the uniqueness of antarctic microbiota and in discussing the question of the indigenuity and activity of microbial life in the most stressed antarctic habitat, the soils of the Ross Desert (McMurdo Dry Valleys). The combination of osmotic stress and low substrate availability may energetically prevent microbial colonization of the arid Ross Desert soils, but conditions in the less salt-burdened soils are not too harsh for microbial life to exist and evolve.

B-48749

Nienow, J.A., Friedmann, E.I., **Terrestrial lithophytic (rock) communities**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.343-412, Refs. p.408-412.

Terrestrial rocks and stones provide several habitats for microbial growth. The epilithic habitat is the rock surface itself. Euendolithic organisms (mostly lichens) bore actively into the rock substratum but, as a rule, also have an epilithic portion. Chasmoendolithic organisms colonize existing cracks and fissures of weathered rocks, whereas cryptoendolithic organisms live in the interstitial spaces of porous rocks, as a rule under a rock crust. Because endolithic communities depend on photosynthesis, only rocks with some degree of translucence are colonized, and the steep light gradient in the rock limits colonization to a few-millimeter-deep zone below the surface. The hypolithic habitat is the stone-soil interface at the lower surface of translucent pebbles or small stones lying half buried on the surface of soil. In this chapter, the authors treat mainly the cryptoendolithic and chasmoendolithic microorganisms that are a prominent feature of antarctic terrestrial biology.

B-48750

Broady, P.A., **Soils heated by volcanism**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.413-432, Refs. p.430-432.

The environmental conditions, biota, ecology, chorological aspects and conservation are reviewed of a few antarctic isolated sites associated with volcanic activity, where the ground surface is warmed from geothermal sources and where steam emissions condense to maintain a moisture supply of unusual regularity compared with other ice-free areas. These sites are of small extent and cover no more than a few hectares on the continent and circumpolar islands, but they have great biological value because organisms found nowhere else in Antarctica live in them, in an environment where selective factors are also unique.

B-48751

Kappen, L., **Lichens in the antarctic region**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.433-490, Refs. p.479-488.

Unlike most microorganisms and plants, lichens form a heterogeneous group of organisms considered to be a trophically specialized group of fungi. These fungi (in antarctic lichens, all ascomycetes) form the mycobiont, which lives in symbiosis with the photobiont, which is either a green microalga (e.g., *Trebouxia*, *Pseudotreboxia*, rarely *Trentepohlia*) or a cyanobacterium (e.g., *Nostoc*, *Scytonema*, *Stigonema*). This chapter deals primarily with the lichens' biological role in Antarctica and briefly discusses the taxonomic problems. The most recent taxonomic nomenclature is followed. Some synonyms and lichenological terms of recent origin are listed in appendices to this chapter. Since lichens are among the most obvious and therefore successful organisms on land, the question is raised whether this success is a result of their symbiotic nature.

B-48752

Simmons, G.M., Jr., Vestal, J.R., Wharton, R.A., Jr., **Environmental regulators of microbial activity in continental antarctic lakes**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.491-541, Refs. p.534-541. For another version see 47-4400 or B-48644.

A considerable body of review literature exists for antarctic aquatic environments, and although the purpose of this review is not to update those exhaustive treatments, some of the more recent research conducted in continental lacustrine environments of Antarctica, particularly as these studies relate to the factors that regulate the microbial ecology of lakes, is summarized here. The focus is primarily on those lakes south of the Antarctic Circle and located on the continent.

B-48753

Vincent, W.F., Howard-Williams, C., Broady, P.A., **Microbial communities and processes in antarctic flowing waters**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.543-569, Refs. p.567-569.

Rivers, streams, and seeps are widely distributed around the margins of Antarctica and provide a major focus for microbial activity in the terrestrial antarctic environment. These flowing waters are derived from melting snowbanks, ice fields, or glacier ice and persist for only a few weeks to months each year before refreezing. They range from percolating flows that intermittently recharge the "wetland communities" on flushed soils and rock surfaces, to well-defined meltwater streams in perennial channels, to rivers with discharges up to several cubic meters per second. These three types of habitat form a continuum of flowing-water environments, and often each physically grades into the next. The food chains in these ecosystems tend to be relatively simple: rotifers, tardigrades, and nematodes are the largest animals. In this review the authors examine the distinctive properties of the antarctic stream environment, and summarize what is known of the microbial community structure and processes in these important and widely distributed antarctic ecosystems.

B-48755

McKay, C.P., **Relevance of antarctic microbial ecosystems to exobiology**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.593-601, Refs. p.600-601.

Antarctica, particularly the cold, dry Ross Desert regions, provides the best terrestrial analog to Martian conditions, so antarctic microbial ecosystems provide a fruitful testing ground for theories of exobiology, particularly for the question of life on Mars. Because ac-

cess to extraterrestrial habitats is so difficult, terrestrial analogs present the best opportunity for both formulation and preliminary testing of hypotheses about life there. Antarctica, as one of few suitable environments for this on earth, will almost certainly be a major locus of progress in exobiology in the next decade.

B-48756

Draggan, S., **Protection of antarctic microbial habitats**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.603-614, 23 refs.

The chapter focuses on the protection of the habitats of antarctic microbes. The roles of microbes in colonization, primary production, and decomposition make them linchpins in the development, structure, and function of all ecosystems; so, to the extent that a case can be made for the protection of one ecosystem, environmental medium, or habitat over another, protection of microbial habitats is vital to protection of the antarctic ecosystem as a whole.

B-48757

Foster, B.A., Montgomery, J.C., **Planktivory in benthic nototheniid fish in McMurdo Sound, Antarctica**, *Environmental biology of fishes*, Mar. 1993 36(3), p.313-318, 36 refs.

Four species of nototheniid fish were sampled from below the sea ice near Cape Armitage, McMurdo Sound: *Pagothenia borchgrevinki* from just below the ice 1.5 km offshore, *Trematomus bernacchii*, *T. hansonii* and *T. centronotus* from off the bottom in about 20 m of water near the shore. Scale worms and isopods were conspicuous non-planktonic prey, and present in the three benthic fish species. The planktonic pteropod mollusc *Limacina helicina* was numerically common in all four species of fish. The planktonic hyperiid amphipod *Hyperiella dilatata* was also found in all fish species. Whereas *P. borchgrevinki* is planktivorous in accord with its pelagic habit, the *Trematomus* spp. clearly also feed on plankton from the water column. *T. hansonii* is particularly planktivorous, taking smaller copepods than *P. borchgrevinki*. (Auth.)

B-48761

Razouls, C., **Checklist of antarctic marine planktonic copepods** [Inventaire des copépodes planctoniques marins antarctiques et sub-antarctiques], *Vie et milieu*, Sep.-Dec. 1992 42(3/4), p.337-343, In French with English summary. Refs. p.341-343.

Updated synonymies and descriptions of numerous new species allows the draft of a first checklist of marine planktonic Copepoda from the antarctic ocean. (Auth.)

B-48772

Chen, F.D., Li, X.D., Kanda, H., **Investigation of the bryophytes in the Fildes Peninsula, King George Island, Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.46-50, In Chinese with English summary. 11 refs.

An account is given of investigations on Bryophyta and Sporophyta carried out from Nov. 1988 to Mar. 1989 on Fildes Peninsula and various neighboring islands. Fifty-four species of Bryophyta, 2 varieties belonging to 29 genera and 16 families, were identified. Only 10 species of Sporophyta were identified. A list of the determined species, and a map of their distribution, are presented in an appendix.

B-48773

Cheng, M.H., Fan, Z.G., **Preliminary studies of acoustic behaviour and sound signals of *Sterna vittata*, Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.51-56, In Chinese with English summary. 5 refs.

This paper describes the acoustic behavior and sound signals of the tern *Sterna vittata* in the Antarctic under natural conditions. The results obtained by analyzing and processing of the signals in the laboratory show that they are mainly composed of a series of pulses and a continuous sound signal. The pulse width of "Ji" of a *S. vittata* is about 0.7 ms, but the number of signal pulses is irregular. There are variations in width and interval of a series of pulses. The signal of "A" of *S. vittata* is a continuous sound signal and its frequency range is 585-4300 Hz. The spectrum peak in frequency is around 2-2.5 kHz. The signals made by two *S. vittata* in playing consist of a series of pulses. Pulse width range is 10.8-16.5 ms, its interval is 6.6-10.8 ms, and the frequency range is 1533-3733 Hz. The spectrum peaks mainly occur around 2.1 and 2.6 kHz. (Auth. mod.)

B-48791

McFeters, G.A., Watters, S.K., **Distribution of enteric bacteria in antarctic seawater surrounding the sewage outfall at McMurdo Station**, *Antarctic journal of the United States*, 1991 26(5), p.319-320, 7 refs.

This study was initiated to describe the persistence, distribution, and environmental impact of enteric bacteria originating from the sewage outfall at McMurdo Station. The focus of this communication is the distribution of the sewage plume in the seawater. The authors describe the preliminary results of a field study that was carried out at McMurdo Station in 1990. A confirmation of these findings as well as experiments to address the other aspects of the project are ongoing.

B-48795

Wasell, A., Håkansson, H., **Diatom stratigraphy in a lake on Horseshoe Island, Antarctica: a marine-brackish-fresh water transition with comments on the systematics and ecology of the most common diatoms**, *Diatom research*, 1992 7(1), p.157-194, 59 refs.

The diatom stratigraphy of Holocene sediment cores from an antarctic lake on Horseshoe I. has been investigated. The diatom analyses show evidence of a transition from a marine to a brackish to a fresh water environment. The diatom stratigraphy is divided into three different assemblage zones (marine, brackish and fresh water), which are mostly in accordance with the lithostratigraphical units as well as with chemical analyses. The diatom succession in the sediment of Skua Lake is not a response to climatic changes. The sediment cores represent a short time scale and the development from a marine to freshwater environment is so dominant that other changes in the diatom flora are hidden. Radiocarbon dates indicate that the isolation of the basin occurred some time after 1860 BP. The possible isostatic uplift resulting from deglaciation of the Marguerite Bay Glacier ca 10,000 year BP is discussed. Systematics and ecology for some of the species in the genera *Achnanthes*, *Cocconeis*, *Fragilaria sensu lato*, *Gomphonema*, *Navicula*, *Nitzschia* and *Pleurosigma*/*Gyrosigma* are discussed. (Auth.)

B-48797

Everson, I., Goss, C., Murray, W.A., **Comparison of krill (*Euphausia superba*) density estimates using 38 and 120 kHz echosounders**, *Marine biology*, 1993 116(2), p.269-275, 17 refs.

A series of observations, using a dual-frequency calibrated echosounder operating at 38 and 120 kHz, of a patch of *Euphausia superba* close to South Georgia in 1986 is described. Sea state is shown to cause significant noise close to the surface, but to cause no significant signal attenuation. There is a consistent difference of 5 dB between the signal levels at the two frequencies, which is in line with the difference noted from independent observations, theoretical models and in studies on encaged aggregations of krill. (Auth.)

B-48798

Peck, L.S., **Larval development in the antarctic nemertean *Parborlasia corrugatus* (Heteronemertea: Lineidae)**, *Marine biology*, 1993 116(2), p.301-310, 36 refs.

Embryonic and larval development were followed from fertilization to settlement in the antarctic heteronemertean *Parborlasia corrugatus* (McIntosh, 1876). Several stages are recognized: first cleavage occurred at 10-15 h, post fertilization; hatching between 170 and 200 h; early pilidium at 435 h; late pilidia were observed aggregating at 1200-1350 h (50- 56 d). There was some indication that larvae could use dissolved organic material, since pilidia held in seawater with organic material removed did not survive as long as those in filtered seawater or in filtered water with added amino acids. However, the only larvae to exhibit settlement behavior in the feeding experiments were those offered *Tetraselmis suecica* and *Thalassiosira pseudonana*, and these required a longer development time to reach this stage than pilidia in the standard cultures, where a mixed algal diet was offered. (Auth. mod.)

B-48799

Kang, S.H., Fryxell, G.A., **Phytoplankton in the Weddell Sea, Antarctica: composition, abundance and distribution in water-column assemblages of the marginal ice-edge zone during austral autumn**, *Marine biology*, 1993 116(2), p.335-348, 60 refs.

At the compacted north-south line of the ice edge, phytoplankton were sampled during early austral autumn of 1986 in the northwestern Weddell Sea. Cells from discrete water bottle samples from 12 stations on two east-west transects were counted to gain quantitative information on the composition, abundance, distribution, and condition of the phytoplankton in water-column assemblages. Over 70 species were found. The highest numbers of total cells (integrated through the top 150 m) were found in open water, well-separated from and to the east of the ice edge on the southern transect, with about 60 billion cells/sq m. With one exception, the relative abundance of diatoms was low at ice-covered stations and high at open-water stations. Overall, the diatom cell density was similar to that found previously during a northward transect from ice-covered to ice-free water at the Weddell-Scotia Sea ice edge (spring 1983). The phytoplankton spatial patterns in the two autumn transects differed, with the more southerly transect exhibiting a higher abundance of diatoms and dinoflagellates. The ratio of full to empty diatoms was higher on the southern transect, indicating a healthy population, while lower ratios of full/empty frustules on the northern transect suggested a generally declining population. (Auth. mod.)

B-48807

De Ridder, C., David, B., Larrain, A., **Antarctic and subantarctic echinoids from 'Marion Dufresne' expeditions MD03, MD04, MD08 and from the 'Polarstern' expedition Epos III, Paris. Muséum national d'histoire naturelle. Bulletin**, June 1992 14(2), p.405-441, With French summary. 59 refs.

The subantarctic and antarctic MD03, MD04, MD08 and Epos III expeditions collected regular and irregular echinoids from the continental shelf around Marion and Prince Edward Islands (MD08), Crozet Is. (MD03, MD08), Kerguelen Is. (MD03, MD04), and the Weddell Sea (Epos III). The collection comprises 31 species belonging to 6 families. Affinities and taxonomic position of 18 species or subspecies are discussed: *Aporocidaris antarctica*, *Ctenocidaris nutrix*, *C. nutrix longispina*, *C. perrieri*, *C. speciosa*, *C. spinosa*, *Homalocidaris gigantea*, *Notocidaris mortenseni*, *N. gaussensis*, *Kamptosoma asterias*, *Sterechinus diadema*, *Plexechinus planus*, *P. aff. cinctus*, *Pourtalesia aff. hispida*, *Amphipneustes rostratus*, *Brachysternaster chesheri*, *Parapneustes abatoïdes* and *Delopatagus brucei*. Geographical and bathymetrical distributions for all species are investigated and tabulated. (Auth.)

B-48808

Post, A., Larkum, A.W.D., **UV-absorbing pigments, photosynthesis and UV exposure in Antarctica: comparison of terrestrial and marine algae**, *Aquatic botany*, Apr. 1993 45(2-3), p.231-243, 19 refs.

Since antarctic plants experience a wide range of ultraviolet (UV) exposure, the pigment content of various antarctic algae was monitored over a year. In summer the mature form of the marine rhodophyte *Palmaria* contains a range of UV-absorbing pigments in high concentration providing a broad absorbance with a maximum at 337 nm. Juvenile fronds develop through winter with smaller absorbance maxima at 322 nm, 309 nm and 295 nm. The terrestrial chlorophyte *Prasiola crispa* contains a single UV-absorbing pigment with a maximum at 325 nm. Compared with other green algae, including the marine *Enteromorpha*, the UV-absorbing pigment in *Prasiola* is present in high concentrations. Variations in the level of UV-absorbance relative to chlorophyll in *Prasiola*, appear to correspond with varying UV exposure. To test this, *Prasiola* was maintained with an enhanced ratio of UV-B to visible light to simulate the effects of stratospheric ozone depletion. After 4 weeks the chlorophyll content and photosynthetic rates were reduced in the presence of enhanced UV-B light, but the ratio of UV-absorbing pigments to chlorophyll was unchanged. This suggests that even for antarctic algae which contain high levels of UV-absorbing pigments, exposure to sunlight with an increased ratio of UV-B to visible light is stressful. (Auth. mod.)

B-48809

Pugh, P.J.A., **Synonymic catalog of the Acari from Antarctica, the sub-antarctic islands and the southern ocean**, *Journal of natural history*, Mar.-Apr. 1993 27(2), p.323-421, Refs. p.414-421.

The records, taxonomy and geographical distribution of 528 species of Acari collected from the Antarctic, sub-antarctic islands and the southern ocean are collated. Included are free-living and phoretic mites, parasites and nidicoles associated with a variety of birds, seals and other introduced mammals, from terrestrial aquatic, seashore and benthic marine habitats. A number of these Acari have been introduced by humans, to and around research stations and disused whaling stations. A full alphabetical index to all current higher taxa, as well as current/redundant generic and specific names, is provided. (Auth.)

B-48810

Nicol, S., Hosie, G.W., **Chitin production by krill**, *Biochemical systematics and ecology*, Mar. 1993 21(2), p.181-184, 21 refs.

The contribution of krill to the oceanic production of chitin is re-examined, using newly published data on the chitin content of antarctic krill and on the production rate of chitin in the form of exuviae. Calculations suggest that earlier estimates of krill chitin production are likely to be overestimates. Krill are, however, among the major arthropod producers of chitin in the oceans, and the antarctic krill fishery at its current level is still a potential major source of chitin to industry. (Auth.)

B-48813

Le Maho, Y., **Undisturbed breeding penguins as indicators of changes in marine resources**, *Marine ecology progress series*, May 19, 1993 95(1-2), p.1-6, 33 refs.

Using an automatic setup for identification and weighing of breeding king penguins *Aptenodytes patagonicus*, the authors demonstrate seasonal differences in the daily gain in body mass and duration of foraging trips of breeders at sea. Taking into account already available information, the new data indicate that it takes longer for breeders to obtain food when marine resources are decreasing. The overall gain

in body mass of the birds at sea is unchanged. However, they accumulate larger body fuel reserves, which therefore increases their energetic safety margin at predictable times of lower food availability, but reduces food brought back to the chicks. In contrast to these seasonal changes, variations in the duration of sojourns into the colony, when penguins come independently to feed the chicks, can be attributed to the stages of the breeding cycle. The authors' setup also enables discriminating when the breeding failure is either due to poor food provisioning at sea or to the inability of the birds to minimize the depletion of their energy reserves when ashore. (Auth. mod.)

B-48814

Stoecker, D.K., Buck, K.R., Putt, M., **Changes in the sea-ice brine community during the spring-summer transition, McMurdo Sound, Antarctica. II. Phagotrophic protists, *Marine ecology progress series*, May 19, 1993 95(1-2), p.103-113, Refs. p.112-113.**

The land-fast sea-ice brine contains a diverse phagotrophic protist assemblage consisting of <5 microns heterotrophic flagellates, *Cryptothecomonas* spp., heterotrophic dinoflagellates, and heterotrophic and mixotrophic ciliates. Fine-scale horizontal spatial variability is a feature of this assemblage; samples taken within 1 m of each other can be dominated by different heterotrophic protists. Many of the larger heterotrophic protists found in the brine are also found in the water column. The photosynthetic ciliate *Mesodinium rubrum* is also common. In mid to late austral spring, the heterotrophic assemblage accounts for about 10% of the total protist biomass in the brine and is dominated by *Cryptothecomonas* spp. This flagellate can reach densities of over 1,000,000 cells/l of brine. In the early austral summer, ciliates (primarily *Strombidium* spp., *Mesodinium rubrum* and *Didinium* spp.) and heterotrophic dinoflagellates (primarily a small *Gymnodinium* sp. and *Polykrikos* sp.) increase in abundance in the brine. By the end of Jan. (just prior to ice decay and break-out), heterotrophic flagellates and ciliates can account for 50% of the protist biomass. (Auth. mod.)

B-48815

Viarengo, A., Canesi, L., Mazzucotelli, A., Ponzano, E., **Cu, Zn and Cd content in different tissues of the antarctic scallop *Adamussium colbecki*: role of metallothionein in heavy metal homeostasis and detoxication, *Marine ecology progress series*, May 19, 1993 95(1-2), p.163-168, 25 refs.**

Cu and Zn concentrations in the gills of the antarctic scallop *Adamussium colbecki* (Smith, 1902) were found to be significantly lower than in the gills of mussel *Mytilus galloprovincialis* (Lam.) and scallop *Pecten jacobaeus* (L.); however, the Cd concentration was significantly higher. In digestive glands, copper concentrations were not significantly different for all 3 species, but *A. colbecki* had a lower Zn concentration and an extremely high Cd concentration (ca 27 micrograms/g wet wt). In *A. colbecki* digestive gland, about 70% of the total Cd was associated with the particulate fraction, and the rest was mostly bound to a metallothionein-type protein. In *P. jacobaeus* a major fraction (about 60%) of the Cd present in the digestive gland was bound to cytosolic metallothioneins. Aging was found not to affect the concentration of Cd bound to metallothioneins in *A. colbecki* digestive gland, although the Cd concentration is slightly reduced in scallops >10 yr old compared to younger (3 to 7 yr old) scallops. (Auth.)

B-48819

Chastel, O., Beaucournu, J.C., **Specificity and eco-ethology of bird fleas on Kerguelen Is. [Notes sur la spécificité et l'éco-éthologie des puces d'oiseaux aux îles Kerguelen (Insecta; Siphonaptera)], *Annales de parasitologie humaine et comparée*, 1992 67(6), p.213-220, In French with English summary. Refs. p.219-220.**

Thirteen of the 35 breeding bird species of the Kerguelen Is. are more or less parasitized by two species of fleas: *Notiopsylla k. kerguelensis* (Taschenberg, 1880) (Pygiopsyllid) and *Parapsyllus heardi* (Rhopalopsyllid) De Meillon, 1952. A general review of the distribution of these parasites and their hosts is given and a check-list of the parasitized species of birds is discussed for these islands. Some data concerning phenology of the two species of fleas are available. *Parapsyllus* ecology revealed interesting aspects: the ability of larvae to live in the down of chicks (*Halobaena caerulea* and *Pachyptila belcheri*) as has been shown for *Glaciopsyllus antarcticus* (Cerato-phyllid), an endemic flea from Antarctica found on another procellariid, *Fulmarus glacialisoides*; and the ability of imago to survive on adult birds foraging in pelagic areas for up to 7 days. (Auth.)

B-48822

Wiencke, C., **Photosynthesis of marine macroalgae from Antarctica: light and temperature requirements, *Botanica acta*, Feb. 1993 Vol.106, p.78-87, Refs. p.86-87.**

The photosynthetic performance of macroalgae isolated in Antarctica was studied in the laboratory. Species investigated were the brown algae *Himantothallus grandifolius*, *Desmarestia anceps*, *Ascoseira mirabilis*, the red algae *Palmaria decipiens*, *Iridaea cordata*, *Gigartina skottsbergii*, and the green algae *Enteromorpha bulbosa*, *Acrosiphonia arcta*, *Ulothrix subflaccida* and *U. implexa*. Unialgal cultures of the brown and red algae were maintained at 0 C, the green algae were cultivated at 10 C. Results indicate considerable physiological adaptation to the prevailing low light conditions and temperatures of antarctic waters. In this respect the lower depth distribution limits and the northern distribution boundaries of these species partly depend on the physiological properties described here. (Auth. mod.)

B-48824

Willkomm, H., Bölter, M., Kappen, L., **Age estimation of antarctic macrolichens by radiocarbon measurements, *Polarforschung*, 1991 (Pub. 1992) 61(2/3), p.103-112, 40 refs.**

From the nuclear bomb tests during the 1950s and early 1960s, the radiocarbon content of the atmospheric CO₂ in the Southern Hemisphere rose within a few years from 98 to 162% of the standard recent value, and then dropped to 122% at the end of 1984. This rapid fluctuation was used to determine the lifetime of five species of lichens collected in the beginning of 1985 in the maritime Antarctic. Under the assumption that lichens assimilate carbon each year at the same rate and that carbon once fixed at least in main branches never will be exchanged later on, the age of mature thalli of *Caloplaca regalis*, *Ramalina terebrata* and *Usnea antarctica* was determined to be 32 years, while *U. aurantiaco-atra* and *Himantormia lugubris* gave an age of ca. 38 years and ca. 60 years, respectively. (Auth.)

B-48828

Andreoli, C., Scarabel, L.R., Tolomio, C., **Distribution of photoautotrophic picoplankton in Terra Nova Bay, summer 1989-1990 [Distribution du picoplancton photoautotrophe dans la baie de Terra Nova (Mer de Ross, Antarctique) pendant l'été austral 1989-1990], *Archiv für Hydrobiologie. Supplement*, Mar. 1993 Vol.96, Algological studies 68, edited by O. Lhotský, p.123-132, In French with English summary. Refs. p.131-132.**

Results obtained from a study carried out during the austral summer of 1989-90 on photoautotrophic picoplankton in the Ross Sea are reported. The observations, with flow cytometry on water samples collected at different depths and at several stations, revealed the presence of the picoplankton. The registered quantities have been generally low (<100 cells/ml, sometimes up to 500 cells/ml) and almost completely consisting of cyanobacteria. Water samples were also used to determine the concentrations of the main nutrients (nitrite,

nitrate, ammoniacal nitrogen and orthophosphate) as well as of chlorophyll *a.* (Auth.)

B-48831

Rosas, M.A., Casanueva, M.E., **Antarctic mites *Neocalvolia* n.sp. from Robert I.** [Acaros de la Antártica: *Neocalvolia* n.sp. (Acari: Winterschmidtidae) de la isla Robert, Shetlands del Sur], *Studies on neotropical fauna and environment*, 1993 28(2), p.65-81, In Spanish with English summary. 6 refs.

Neocalvolia coperminensis sp.n. is described from Coppermine Cove, Robert I. Included are descriptions of the male and female, with illustrations and pictures taken with the aid of a photomicroscope. (Auth.)

B-48832

Lahdes, E.O., Kivivuori, L.A., Lehti-Koivunen, S.M., **Thermal tolerance and fluidity of neuronal and branchial membranes of an antarctic amphipod (*Orchomene plebs*); a comparison with a Baltic isopod (*Saduria entomon*), *Comparative biochemistry and physiology*, July 1993 105A(3), p.463-470, Refs. p.468-470.**

Thermal tolerance and fluidity of neuronal and branchial membranes of the antarctic amphipod *Orchomene plebs* (Hurley) are determined and a comparison with the Baltic isopod *Saduria entomon* (L.) is made. The critical thermal maximum (CT_{max}) and the lethal temperature of *O. plebs* were tested without any acclimation in a continuously rising temperature (0.2 C/min), and survival was determined after 18 hr recovery time in the cold. With this method the CT_{max} of *O. plebs* was found to be 8-10 C and LT₅₀ = 19.5 C. The membranes of both neuronal and branchial tissues were more fluid in *O. plebs* than in *S. entomon*. The neuronal membranes in both species were more fluid than those in the gills. (Auth.)

B-48833

Aguilera, E., Moreno, J., Ferrer, M., **Blood chemistry values in three *Pygoscelis* penguins, *Comparative biochemistry and physiology*, July 1993 105A(3), p.471-473, 16 refs.**

Analyses of 23 blood chemistry values were made in 26 penguins representing three different species *Pygoscelis adeliae*, *P. antarctica* and *P. papua*. Means, standard deviations and differences between species using multiple range tests were obtained for each parameter investigated. *P. papua* exhibits values of total protein and LDH greater than the other two species, and lower values of cholinesterase, amylase and glucose. Mean concentration of urea was lowest in the blood of *P. antarctica*, and alkaline phosphatase mean value was highest in this species. Blood chemistry values in *Pygoscelis* penguins were essentially similar to those described in other bird groups. No apparent variation in penguin normal values was found that could be interpreted as an adaptation to special antarctic environmental conditions. (Auth.)

B-48834

Davey, M.C., **Carbon and nitrogen dynamics in a small pond in the maritime Antarctic, *Hydrobiologia*, Apr. 30, 1993 257(3), p.165-175, 19 refs.**

The carbon and nitrogen dynamics in a typical pond on Livingston I. were investigated during summer 1991. The pond vegetation consisted of a benthic mat of cyanobacteria, diatoms and chlorophytes. The mat was not limited by nutrient availability, both phosphorus and nitrogen being available in the overlying water and N:P ratios in both the water and the mat indicating a roughly balanced supply. Maximal rates of carbon fixation of 0.1-0.2 mgC/g dry weight/h were similar to those of other perennial antarctic mat com-

munities. Productivity appeared to be limited by physical factors, but the effects of irradiance and temperature could not be separated. Although carbon fixation rates were low, carbon loss processes were minimal, leading to an accumulation of material in the mat approximating one doubling per year. Atmospheric nitrogen fixation was not a significant component of the nitrogen budget of the pond, accounting for only 0.1% of the nitrogen accumulation by the mat. Nitrogen uptake was largely from dissolved nitrogen sources, in particular as dissolved organic nitrogen. It is concluded that ephemeral water bodies may play a significant role in the nutrient dynamics of maritime antarctic ecosystems. (Auth.)

B-48836

Detrich, H.W., III, Parker, S.K., **Divergent neural beta tubulin from the antarctic fish *Notothenia coriiceps neglecta*: potential sequence contributions to cold adaptation of microtubule assembly, *Cell motility and the cytoskeleton*, 1993 24(3), p.156-166, Refs. p.164-166.**

The cytoplasmic microtubules of cold-adapted antarctic fishes, unlike those of homeotherms and temperate poikilotherms, assemble and function at body temperatures in the range -1.8 to +2 C. To determine whether alterations to the primary sequence of beta tubulin may contribute to enhancement of microtubule assembly at cold temperatures, the authors have cloned and sequenced a 1.8-kilobase neural beta-chain cDNA. Ncnbeta1, from an antarctic rockcod, *Notothenia coriiceps neglecta*. Based on nucleotide sequence homology, Ncnbeta1 probably corresponds to a class-II beta tubulin gene. The 446-residue beta chain encoded by Ncnbeta1 is closely related both to the neural class-I/II isotypes and to the neural/testicular class-IV variants of higher vertebrates, but the sequence of its carboxy-terminal isotype-defining region has diverged markedly. Furthermore, the Ncnbeta1 polypeptide contains 6 unique amino-acid substitutions not found in other vertebrate brain isotypes, and the carboxy-terminal region possesses a unique tyrosine inserted at position 442. It is concluded that Ncnbeta1 encodes a class-II beta tubulin that contains sequence modifications, located largely in its interdimer contact domain, that may contribute to cold adaptation of the microtubule assembly. (Auth. mod.)

B-48849

Croxall, J.P., **Diving pattern and performance in the macaroni penguin *Eudyptes chrysolophus*, *Journal of zoology*, May 1993 230(1), p.31-47, 38 refs.**

The pattern and characteristics of diving in two female macaroni penguins were studied during the brooding period, using continuous-recording time-depth recorders, for a total of 18 days (15 consecutive days) during which the depth, duration and timing of 4,876 dives were recorded. Diving in the first 11 days was exclusively diurnal, averaging 244 dives on trips lasting 12 hours. Near the end of the brooding period trips were longer and included diving at night. About half of all trips (except those involving continuous night-time diving) was spent in diving and dive rate averaged 14-25 dives per hour (42 per hour at night). The duration of daytime dives varied between trips, and averaged 1.4-1.7 min, with a subsequent surface interval of 0.5-0.9 min. Dive duration was significantly directly related to depth, the latter accounting for 53% of the variation. The average depths of daytime dives were 20-35 m (maximum depth 115 m). Dives at night were shorter (average duration 0-9 min) and much shallower (maximum 11 m); depth accounted for only 6% of the variation in duration. Estimates of potential prey capture rates (3-5 krill per dive; one krill every 17-20 s) are made. Daily weight changes in chicks were directly related to number of dives, but not to foraging trip duration nor time spent diving. (Auth. mod.)

B-48850

Dilly, P.N., **Feeding and gut contents in *Cephalodiscus nigrescens* (Hemichordata, Pterobranchia) from the Weddell Sea**, *Journal of zoology*, May 1993 230(1), p.63-67, 12 refs.

The gut of the pterobranch hemichordate *Cephalodiscus nigrescens* contains plankton of sizes from less than 1 micron to over 100 microns in diameter. Some of the smaller plankton are clumped together in a spherical bolus that is mucus-bound. Most plankton types known from the habitat are represented among the gut contents. (Auth.)

B-48856

Brandt, A., **New deep-sea isopod from the Weddell Sea, Antarctica; *Coperonus pinguis* n. sp. (Crustacea, Isopoda, Munnopsidae)**, *Bijdragen tot de dierkunde*, 1992 62(1), p.55-61, With German summary. 8 refs.

A new species of *Coperonus*, *C. pinguis*, is described from the antarctic deep sea. It is the first record of an antarctic deep-sea species in this genus, and the southernmost record of *Coperonus*. (Auth.)

B-48857

Mackensen, A., Fütterer, D.K., Grobe, H., Schmiedl, G., **Benthic foraminiferal assemblages from the eastern South Atlantic Polar Front region between 35 deg and 57 deg S: distribution, ecology and fossilization potential**, *Marine micropaleontology*, July 1993 22(1/2), p.33-69, 52 refs.

The distribution of the potential fossil assemblages defined by Q-mode principal component analysis mirrors the Recent hydrographic, as well as the trophic situation in the eastern South Atlantic. Two southern component bottom water faunas reflect the northward flow of Antarctic Bottom Water (AABW) and Lower Circum-Polar Deep Water (LCDW): an assemblage dominated by the arenaceous *Multifidella nodulosa* below the calcite compensation depth (CCD), and a *Nuttallides umbonifer* dominated assemblage above the CCD. In the region of highest bio-silicious primary productivity, south of the Polar Front and north of the winter sea-ice limit, these faunas are overprinted by a southern high-productivity fauna, dominated by infaunal species. North Atlantic Deep Water (NADW) meets the Circum-Polar Deep Water (CDW) at intermediate depth, as reflected in the distribution of the northern component deep water fauna. The high-productivity assemblage overprinting this fauna, the northern high-productivity fauna, is dominated by the shallow endobenthic *Bulimina aculeata*. A strong bottom-current fauna, dominated by *Angulogerina angulosa*, characterizes areas between 400 and 900 m water depth with sandy sediment, independent from water mass characteristics and food supply. (Auth. mod.)

B-48878

Zernova, V.V., **Phytoplankton of the Atlantic meridional and latitudinal transects in Nov.-Dec. 1985** [Raspredelenie fitoplanktona na meridional'nom i shirotnom transokeanicheskikh razrezakh v Atlanicheskom okeane v noiabre-dekabre 1985 g.], *Antarktika; doklady komissii*, 1992 No.30, p.118-124, In Russian with English summary. 11 refs.

The study of phytoplankton along meridional and latitudinal ocean transects has identified the more productive waters in off-shore areas (more than 5000 cells/l) of Western Africa and South America and in the open ocean, especially in the subantarctic and antarctic waters of the Atlantic. In the Polar Front zone (55S), the crop of phytoplankton reaches its maximum in the spring (more than 100,000 cells/l), but 5 deg further south the phytoplankton total quantity is extremely low because of the pre-spring conditions. The latitudinal changes in the phytoplankton structure are discussed. (Auth. mod.)

B-48879

Margulis, R.I.A., **Siphonophora from the Indian sector of the Antarctic** [Sifonofory indiiskogo sektora Antarktiki], *Antarktika; doklady komissii*, 1992 No.30, p.125-134, In Russian with English summary. 38 refs.

Nineteen species of Siphonophora have been identified from samples of plankton collected in the Indian sector of the Antarctic in summer of 1982-83 and 1985 with the help of a Juday net. Siphonophora can be found at all layers from 25-0 m to 2000-1000 m. The geographical distribution of the species collected is discussed. Five species are antarctic-subantarctic, 3 species are bipolar (arctic-antarctic and subantarctic-antarctic), 4 species are cosmopolitan, 3 species are tropical-antarctic and 4 species are broadly tropical. (Auth.)

B-48880

Fedotov, A.S., Men'shenina, L.L., **Interannual variations of krill larvae abundance in the Scotia Sea** [Mezhgodovaya izmenchivost' chislennosti lichinok *E. superba* v more Skosha], *Antarktika; doklady komissii*, 1992 No.30, p.135-139, In Russian with English summary. 14 refs.

The abundance of krill larvae during 10 summer seasons in the central part of the Scotia Sea is discussed. The larvae number varies from year to year. The clear connection between larvae abundance and the rate of ice melting is demonstrated. (Auth.)

B-48881

Makarov, R.R., Soliankin, E.V., **Regional characteristics of *Thysanoessa macrura* spawning time in waters off the Antarctic Peninsula and in the Bellingshausen Sea** [Regional'nye osobennosti nerestovogo taïminga *Thysanoessa macrura* G.O. Sars (Euphausiacea) u Antarkticheskogo p-va i v more Bellinsgauzena], *Antarktika; doklady komissii*, 1992 No.30, p.140-150, In Russian with English summary. Refs. p.149-150.

Data on the abundance and age composition of *Thysanoessa macrura* larvae in the eastern part of the Pacific sector of the southern ocean, obtained at 76 stations during an oceanographic survey of the *Akademik Knipovich* in Jan.-Feb. 1978, are discussed. Analysis of spatial distribution and larval age groups, as well as of the total number of larvae, shows regional differences: 5 types of larval stages are determined and, correspondingly, the investigated area is subdivided into 5 separate districts which are identified with phenological zones (phenozones). The gradual altering of phenological phases is linked to the planktonic seasonal succession at different latitudes of the southern ocean. The deviations of phenozones from the circumpolar zonal course are determined by the irregularities of the current system and the distribution of antarctic water modifications. This causes irregularities of *T. macrura* larvae abundance and their age composition. (Auth. mod.)

B-48882

Makarov, R.R., **Composition and distribution of phytocoenoses in the vicinity of the Riiser-Larsen Ice Shelf** [Kachestvennyï sostav fitotsenov i ikh rasprostranenie v sektore moria Riser-Larsena i prilozhashchikh vodakh], *Antarktika; doklady komissii*, 1992 No.30, p.151-164, In Russian with English summary. 18 refs.

Phytoplankton species composition studies have been carried out on the basis of samples collected on board the *Professor Vize* in Feb.-Apr. 1988, in the vicinity of the Riiser-Larsen Ice Shelf. The phytocoenosis *Chaetoceros criophilus* is brought with the Antarctic Circumpolar Current to the northern and northeastern part of the region. Analogous phytocoenosis, which also includes small chaetocerids, is found in the northwestern part of the Kosmonavtov Sea. In the mixed waters of the eastern part of the Weddell Gyre, a separate

phytocoenosis is formed (possibly *in situ*), which consists of *Thalassiothrix antarctica* (dominant species) and also includes small quantities of another regular component. *Fragilariopsis* spp. This phytocoenosis drifts outside of the Weddell Gyre to the southeast and separates the two above mentioned phytocoenoses at the Kosmonavtov Sea. Another separate phytocoenosis (absolute dominance of *Rhizosolenia hebetata*) has been found at the pole of the east rotation of the Weddell Gyre. The direction of *Euphausia superba* swarm drift is considered in relation to the path of *T. antarctica*/*Fragilariopsis*' drift. (Auth. mod.)

B-48883

Klopov, V.P., **Effects of intercontinental flights to the Antarctic on physiological and biochemical parameters in laboratory animals** [Vliianie mezhkontinental'nykh pereletov v Antarktidu na fiziologo-biokhimicheskie pokazateli organizma eksperimental'nykh zhivotnykh], *Antarktika; doklady komissii*, 1992 No.30, p.165-170, In Russian with English summary. 17 refs.

This article describes the results obtained from studies of laboratory animals' physiological and biochemical parameters during their 4-month stay in the Antarctic and a 3,5-month readaptation period in mid-latitude conditions. The animals were taken to the Antarctic and back by plane, with an average flight duration of 4-6 days. The rapid translatitudinal transference of the animals is accompanied by considerable expenditures of energy and plastic materials. The stay in the Antarctic depressed all the parameters of the animals' vitality. The readaptation period, especially at the beginning, was accompanied by a pronounced stress reaction continuing till the end of the observation period. A dose of adaptogen had a favorable effect and promoted the acceleration of the internal proliferation process. The authors conclude that the period of readaptation to mid-latitude conditions after a rapid translatitudinal flight from the Antarctic is as long as the period of the stay in the Antarctic. The use of adaptogens at the beginning of the period of adaptation to the hostile environment is recommended. (Auth.)

B-48889

Bester, M.N., Skinner, J.D., **Marion Island cat programme**, *South African journal of antarctic research*, 1991 21(2), p.117, 14 refs.

The feral house cat *Felis catus* population, originating from five pets introduced to Marion I. by 1949, was estimated at 2,139 \pm 290 individuals in 1975. The 1975 cat population consumed an estimated 450,000 burrowing petrels and posed a serious threat to the remaining populations, the common diving petrel *Pelecanoides urinatrix* having been decimated as early as 1965. Eradication offers the only long-term solution to the cat problem at Marion I. Currently, action is directed at mass trapping and the use of poisoned baits after due consideration of humaneness of the exercise, risks to handlers and possible environmental pollution. It is believed that with sustained effort, eradication of the few possible surviving cats will be achieved in the foreseeable future. The vastly improved breeding success with winter-breeding *Pterodroma macroptera* population in 1990 already bears testimony to the virtual elimination of predation pressure by cats on Marion I.

B-48890

Smith, V.R., **Terrestrial biological research at the Prince Edward Islands**, *South African journal of antarctic research*, 1991 21(2), p.118-123, 5 refs.

Terrestrial biological research conducted within the South African National Antarctic Research Program has until recently focussed on Marion and Prince Edward Is. In the account presented, the author has not attempted to describe the individual research projects carried out within the Biological Research Program at the islands, or to summarize their results. Rather, he has tried to trace the evolution

of the program as a whole, by pointing out the changes that have occurred in its structure, philosophy and objectives. He also lists projects carried out at the islands in the order of the date of their initiation, to illustrate the changes in emphasis of the research.

B-48893

Best, P.B., Butterworth, D.S., **South African research on antarctic whales**, *South African journal of antarctic research*, 1991 21(2), p.129, 13 refs.

In 1969, South African scientists began aerial surveys of the population of southern right whales that migrated to South African waters from the subantarctic. This species has been protected the longest (since 1940) and depleted to the greatest extent (about 0.1% of its original size) of all southern baleen whales. Fixed-wing surveys from 1969 to 1987 have shown that this population is increasing at an exponential rate of 7% a year. Given the observed calving rate (once every three years), and likely age at first reproduction, this rate of increase must be considered close to the maximum possible, and as such has implications for an understanding of baleen whale population dynamics in general.

B-48894

Miller, D.G.M., **Conservation of antarctic marine living resources: a review and South African perspective**, *South African journal of antarctic research*, 1991 21(2), p.130-142, Refs. p.141-142.

Together, Antarctica and the surrounding southern ocean constitute a remote and unique ecosystem which is strongly influenced by the physical environment. The susceptibility of the marine component of this system to human impact has been amply demonstrated by the detrimental consequences of whaling and sealing in the late 19th and 20th centuries. There is now increasing concern that over-harvesting of krill (*Euphausia superba*) and the possible effects of offshore mineral exploitation will further affect marine living resources. The region's legal status is largely determined by the Antarctic Treaty, and its Consultative Parties (ATCP's) have given high priority to ecological considerations through the enactment of a number of environmental protection and conservation protocols. These include the Convention for the Conservation of Antarctic Seals (CCAS), the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA), which has recently been replaced by the Protocol to the Antarctic Treaty on Environmental Protection. Under international law, the Treaty System (ATS) binds all states to refrain from inflicting wanton damage on the antarctic environment as a whole and, in the case of CCAMLR, on the marine environment in particular. The significance of the ATS to South Africa as an ATCP in combination with the Republic's geographic proximity to the region is discussed. (Auth.)

B-48895

Miller, D.G.M., **South African research on antarctic krill**, *South African journal of antarctic research*, 1991 21(2), p.143, 9 refs.

Current South African krill research is geared towards monitoring the impact of fisheries on krill and possible interactions between krill, the fishery and related species. A key element of this approach is investigation of the nature and extent of krill aggregation, and how this is reflected in the species' availability to the fishery and its distribution.

B-48898

Lutjeharms, J.R.E., **History of recent South African marine research in the southern ocean**, *South African journal of antarctic research*, 1991 21(2), p.159-164, Refs. p.163-164.

For many years South Africa's antarctic research has been focussed exclusively on the antarctic continent and on the subantarctic islands Gough and Marion and their immediate vicinities, with only occasional interest shown in the ocean areas traversed. Since the 1970s, however, considerable work has been carried out in the southern ocean on acoustic determinations of krill stocks, and on the influence of subantarctic islands on their oceanic environment. (Auth.)

B-48899

Bester, M.N., Skinner, J.D., **South African research on antarctic seals, *South African journal of antarctic research*, 1991 21(2), p.165-166, 20 refs.**

A brief review is presented of investigations carried out by South Africa, separately and jointly with Australia, on the subantarctic and antarctic seal populations from 1973 to the present. The trends observed in the Subantarctic confirmed continued population increases over the seals' whole distributional range, showing different phases of population growth. In Antarctica, the major find in 1977—that the rare Ross seal *Ommatophoca rossii* occurred at consistently higher densities despite differing pack ice conditions over 4 consecutive years—led to follow-up studies of this species.

B-48900

Miller, D.G.M., **Impact of BIOMASS-related research on South African antarctic science, *South African journal of antarctic research*, 1991 21(2), p.167-171, 11 refs.**

The impact of the international BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) Program on South African science in the Antarctic is assessed. An analysis was undertaken of refereed papers, reports or theses containing BIOMASS-related research findings, published in indigenous or foreign literature. During the program's 16-year existence (Jan. 1975 to Sep. 1991), a total of 163 South African scientists, or their associates, accounted for some 401 publications. This information was analyzed further to assess the productivity of individual South African scientists involved with BIOMASS. Criteria used by the South African National Antarctic Programme (SANAP) to assess new research were applied to further evaluate BIOMASS's effect on the national antarctic scientific effort. Results indicate that BIOMASS has significantly influenced the direction, extent and impact of recent South African research in the Antarctic, particularly in the marine life sciences. (Auth.)

B-48909

Smith, V.R., **Climate change and its ecological consequences at Marion and Prince Edward Islands, *South African journal of antarctic research*, 1991 21(2), p.223-224.**

The South African Committee for Antarctic Research recently initiated a multidisciplinary project focussed on the biological and ecological consequences of climate change at Marion and Prince Edward Is. Based on the results of previous bioenergetic and nutrient-cycling studies, a possible scenario of these consequences was proposed, which is serving as a set of working hypotheses for the current project. The scenario is briefly described. The project should contribute significantly to an understanding of the functional responses of organisms, populations and ecosystems to abiotic and biotic perturbations. It will also enable rational conservation and management criteria to be identified, once statutory protection is finally afforded to Marion and Prince Edward Is.

B-48911

Wilson, P.W., Beaglehole, D., DeVries, A.L., **Antifreeze glycopeptide adsorption on single crystal ice surfaces using ellipsometry, *Biophysical journal*, June 1993 64(6), p.1878-1884, 26 refs.**

Antarctic fishes synthesize antifreeze proteins which can effectively inhibit the growth of ice crystals. The mechanism relies on adsorption of these proteins to the ice surface. Ellipsometry has been used to quantify glycopeptide antifreeze adsorption to the basal and prism faces of single ice crystals. The rate of accumulation was determined as a function of time and at concentrations between 0.0005 and 1.2 mg/ml. Estimates of packing density at saturation coverage have been made for the basal and prism faces. (Auth.)

B-48912

Capon, R.J., **Extraordinary levels of cadmium and zinc in a marine sponge, *Tedania charcoti* Topsent: inorganic chemical defense agents, *Experientia*, Mar. 15. 1993 49(3), p.263-264, 4 refs.**

The antarctic marine sponge *Tedania charcoti* has been found to contain extraordinarily high natural concentrations of cadmium and zinc, which have in turn been correlated to the ability of the crude ethanol extract to modulate protein phosphorylation in chicken fore-brain and to inhibit the growth of several test bacteria. (Auth.)

B-48914

Daneri, G.A., Coria, N.R., **Fish prey of antarctic fur seals, *Arctocephalus gazella*, during the summer-autumn period at Laurie Island, South Orkney Islands, *Polar biology*, July, 1993 13(5), p.287-289, 15 refs.**

The fish component in the diet of antarctic fur seals was investigated at Laurie I. from mid Jan. to Apr. 1988. Fish otoliths occurred in 78.8% of faecal droppings. Most of the otoliths extracted from scats belonged to Myctophid fish (93.4%), mainly *Electrona antarctica* and *Gymnoscopelus nicholsi*. These two fish species thus constituted the bulk of the diet. A greater percentage of the otoliths from *G. nicholsi* (31.1%) in this study were considered suitable for measurement in comparison with 10.3% from scats at Heard I. in 1990 and 11.4% at Macquarie I. in 1988/89. This lesser degree of erosion would suggest that foraging areas of fur seals during this study were closer to land than during previous studies. During the period studied, the commercial fishery around the South Orkneys was not based on Myctophid fish, so there was no direct competition for fish between the fur seals and fisheries. (Auth.)

B-48915

Kiest, K.A., **Relationship of diet to prey abundance and the foraging behavior of *Trematomus bernacchii*, *Polar biology*, July, 1993 13(5), p.291-296, 25 refs.**

Little information is available regarding fish diets in Antarctica and how they relate to prey availability. The primary objective of this work was to describe the diet of *Trematomus bernacchii*. The second objective was to compare prey taken with prey present in the benthos along a spatial gradient of prey abundance using Ivlev's Index of Electivity. All samples were collected from 4 different sites on the east side of McMurdo Sound. Fish were captured by divers at the same depth at each site and their stomachs were flushed for dietary analysis. The diet of *T. bernacchii* varied among sites, and prey selectivity varied inversely with prey abundance. Many of the prey taken by *T. bernacchii* were sedentary species, which suggests that *T. bernacchii* is a hunt and peck predator. (Auth.)

B-48916

Bölter, M., **Effects of carbohydrates and leucine on growth of bacteria from antarctic soils (Casey Station, Wilkes Land), *Polar biology*, July, 1993 13(5), p.297-306, Refs. p.305-306.**

Growth rates of natural bacterial communities from antarctic soils were analyzed by an epifluorescence microscopic method using data of microcolonies (colony number and colony areas). Incubations were performed on polycarbonate filters which are put on cellulose

pads soaked with soil extracts, different concentrations of naturally occurring carbohydrates, polyols, and leucine. Concentrations of individual substrates were in the range of naturally occurring levels. The results showed that the growth of bacterial microcolonies could best be stimulated with glucose, sucrose, maltose, sorbitol, and mannitol. Leucine stimulated growth to a lower extent than glucose. Data on bacterial biomass production calculated from this approach are discussed in relation to those from tracer techniques carried out with C-14 labelled glucose from earlier experiments. (Auth.)

B-48917

Bathmann, U.V., Makarov, R.R., Spiridonov, V.A., Rohardt, G., **Winter distribution and overwintering strategies of the antarctic copepod species *Calanoides acutus*, *Rhincalanus gigas* and *Calanus propinquus* (Crustacea, Calanoida) in the Weddell Sea, *Polar biology*, July, 1993 13(5), p.333-346, Refs. p.345-346.**

During the Winter Weddell Gyre Study in Sep.-Oct. 1989, the horizontal and vertical distribution, stage composition and feeding condition of the three antarctic copepod species *Calanoides acutus*, *Rhincalanus gigas* and *Calanus propinquus* were studied. The data indicate that *C. acutus* and *R. gigas* have the bases of their distributional ranges in the Antarctic Circumpolar Current (ACC) and in the Warm Deep Water (WDW) entering the Weddell Gyre (WG). *C. propinquus* live mainly in the cold WG south of the ACC. *C. acutus* overwinter mainly in the WG as stage IV copepodites (C). Males prevail over females and are confined to a rather narrow layer between 500 and 1000 m. Feeding experiments suggest all deep-living stages to be resting. In the ACC zone the life cycle is different and winter breeding of overwintered adults occurs. Most of the *C. propinquus* population overwinter in the WG as C III-V, inhabiting the WW. In the upper water layers in the interior of the WG, C III dominate. Shallow living *C. propinquus* are in the active feeding state. Persistence of active feeding zooplankton populations in the WW of the WG can be an important factor influencing processes of phytoplankton development and the particle flux. (Auth. mod.)

B-48918

Janssen, H.H., **Morphology, egg cocoons, and transmission paths of the antarctic leech *Glyptonotobdella antarctica* Sawyer and White, 1969 (Hirudinea: Rhynchobdelliformes: Piscicolidae), *Polar biology*, July, 1993 13(5), p.347-354, 19 refs.**

The biology of piscicolids which move between different host species is poorly understood. Very little is known about leeches of antarctic waters, though they are not uncommon in that region. This paper adds to the fundamental knowledge of the antarctic piscicolid leech *Glyptonotobdella antarctica* Sawyer and White, 1969. Besides *Glyptonotus antarcticus* Eights 1853, sea urchins of the genus *Stereochinus* (Meissner 1900), and the benthic octopus *Pareledone (charoti?)* (Joubin 1905) serve as hosts. Hitherto there were only two records on piscicolids from *Octopus dofleini* and none from sea urchins. Egg cocoons on the ventral side of the isopod *G. antarcticus* were attributed to the leech. Most likely *G. antarctica* moves between different hosts, i.e. antarctic octopuses and their potential prey. Surface structures of the leech were studied by light and scanning electron microscope. These observations complement the basic knowledge on antarctic leeches and provide arguments for phylogenetic discussions. (Auth. mod.)

B-48919

Cherel, Y., Verdon, C., Ridoux, V., **Seasonal importance of oceanic myctophids in King Penguin diet at Crozet Islands, *Polar biology*, July, 1993 13(5), p.355-357, 15 refs.**

Commercial fisheries of lanternfishes (Myctophidae: Osteichthyes) began a few years ago in the Atlantic sector of the southern

ocean, and exploitable stocks of myctophids probably also occur in the Indian and Pacific sectors. The Scientific Committee for the Conservation of Antarctic Marine Living Resources recommended to collect information on potential competition between these fisheries and populations of predators. The King penguin (*Aptenodytes patagonicus*) is the most specialized subantarctic seabird preying upon mesopelagic myctophids, and more than 50% of the bird's world population is located on the Crozet Archipelago. Since only limited King penguin diet data from Crozet Is. are available, the authors investigated the food of King penguin chicks during their extended fledging period (about 11 months) to test for seasonal variation and the significance of their main prey in relation to the bird's breeding cycle. (Auth.)

B-48920

Roberts, N.J., Burton, H.R., **Sampling volatile organics from a meromictic antarctic lake, *Polar biology*, July, 1993 13(5), p.359-361, 4 refs.**

A meromictic, hypersaline antarctic lake (Organic Lake, Vestfold Hills) was sampled for volatile organics during 1991. Water was collected using a modified Kemmerer bottle; density and redox potential profiles of the water were obtained from analysis of Kemmerer bottle samples. The integrity of the Kemmerer bottle, after triggering, was questioned during the year; the difference in density of the water column appeared to be the major cause of the leakage. Subsequent modifications were made to ensure a complete seal was maintained. (Auth.)

B-48922

Roberts, C.A., **Review of COMNAP/SCALOP accomplishments, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.10-11.**

Antarctic Operators formed the Council of Managers of National Antarctic Programs (COMNAP) and its subgroup SCALOP (Standing Committee on Antarctic Logistics and Operations) to share experiences and information, to realize international cooperation at the implementation level, to implement the Recommendations of the Antarctic Treaty, and to offer the benefits of Antarctic Operator experiences to the Treaty. COMNAP is affiliated with SCAR, which disbanded its former Working Group on Antarctic Logistics after SCALOP was established. COMNAP was granted observer status by the Treaty in 1991. COMNAP is concerned with the environment in Antarctica and the science being done there. COMNAP/SCALOP efforts to protect the antarctic environment also include consideration of the use of alternative energy sources where feasible to replace diesel fuel-burning generators.

B-48924

Lyons, D., **Environmental impact assessment in Antarctica, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.27-40, 14 refs. For another version of this article see B-48341.**

The background to the development and implementation of environmental impact evaluation procedures in Antarctica is reviewed, and the principles and procedures of the Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol) are outlined. The difficulties in determining the appropriate level of assessment and the practical operational aspects of carrying out the evaluations are examined. Particular attention is given to the meaning of terminology in the Protocol; the interpretation of environmental principles and standards; alternatives to the proposed activity; the requirements for sufficiency of information for the purpose of prior assessment; the

process of obtaining and taking into account public comment; the monitoring of environmental indicators; and the practical implications where an activity needs to be suspended, cancelled or modified. The bureaucratic and other workload generated by the procedures and the credibility of the processes are discussed. Environmental impact assessments for antarctic projects conducted prior to the adoption of the Madrid Protocol, and a number of environmental impact evaluations of projects undertaken since, including the 'Removal of Old Casey Station' and the 'Re-introduction of Hydroponics to ANARE Stations' carried out by the Institute of Antarctic and Southern Ocean Studies, are used as examples. (Auth.)

B-48925

Crumrine, K.Z., **Surface remediation at McMurdo Station, Antarctica**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.41-60.

Fortress Rocks Landfill is a 4-acre landfill site used since 1980 for the deposition of debris generated at McMurdo Station. The landfill consisted of debris buried under soil backfill and exposed debris generated more recently. The landfill, a natural ravine, was filled with debris and leveled with backfill to create burn pads, level storage areas, and a road. This paper describes the technical and logistic tasks involved with the cleanup of the landfill and waste yard. The paper is divided into sections which describe the equipment, technical approach to complete the tasks, health and safety monitoring conducted during the cleanup, and sampling and analysis performed to determine if further remediation is necessary.

B-48932

Heuser, J.P., **Role of the Chilean Navy in the control of pollution in Antarctica**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.154-156.

The responsibilities of Chilean ships, equipped for rescue and pollution control operations in the antarctic marine environment, are listed as follows: logistic support to stations; hydrographic surveys of bays, passages and channels; maintenance of marine signalling; notice to navigators; meteorological reports; oceanographic studies; and prediction of sea tides and currents.

B-48935

Brown, A.J., Strickland, V.E., **Fuel spill response contingency planning process**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.177-198, Refs. p.197-198.

The potential impact of fuel spills in Antarctica, particularly in marine areas, is of international concern. At the 1989 Antarctic Treaty Consultative Meeting (ATCM), Spill Recommendation XV-24 urged the Treaty Parties to establish contingency plans for marine spill response. Annex IV, Article 15 of the Protocol on Environmental Protection to the Antarctic Treaty, done at Madrid in 1991, requires contingency plans for response to incidents with potential adverse environmental effects. The U.S. Antarctic Program (USAP) initiated spill response planning in Sep. 1990, and has been working closely with the Standing Committee on Antarctic Logistics and Operations (SCALOP), Sub-group on Oil Spill Prevention and Response, to recommend the format and content of such plans to the Council of Managers of National Antarctic Programs (COMNAP). This paper discusses the USAP six-phase contingency planning process. (Auth.)

B-48949

Schinner, G.O., McClintock, J.B., **Structural characteristics of marsupial brood pouches of the antarctic sea urchins *Abatus nimrodi* and *Abatus shackletoni* (Echinoidea: Spatangoida)**, *Journal of morphology*, Apr. 1993 216(1), p.79-93, Refs. p.92-93.

Marsupial spines, tubercles, and pedicellariae of the antarctic brooding spatangoids *Abatus nimrodi* and *A. shackletoni* have been examined by scanning electron microscopy. Individual brood pouches of *A. nimrodi* may hold up to 28 embryos and juveniles, and those of *A. shackletoni* may hold up to 38 lecithotrophic embryos and juveniles. Juveniles can be divided into those with early development of external elements and a mean size of 2.0 and 1.6 mm, respectively, and those equipped with fully developed external elements and a mean length of 4.3 and 2.8 mm, respectively. Mean diameters of aboral brood pouch openings of *A. nimrodi* and *A. shackletoni* were 6.5 and 4.1 mm, respectively. Brood pouches contain tall, distally enlarged spines, and smaller, layered cover-spines, which form a protective arch over the marsupia. There are also slender brood-pouch-bottom spines, which have an extremely thickened spinal epidermis. *A. nimrodi* has mainly bidentate, but also tri- and quadrodentate pedicellariae. *A. shackletoni* has two forms of tridentate, rostrate, and globiferous pedicellariae. In *A. shackletoni*, marsupial spine density is significantly lower than in *A. nimrodi*. These differences may be related to distinct sediment characteristics in their respective habitats. (Auth.)

B-48950

McClintock, J.B., Slattey, M., Thayer, C.W., **Energy content and chemical defense of the articulate brachiopod *Liothyrella uva* (Jackson, 1912) from the Antarctic Peninsula**, *Journal of experimental marine biology and ecology*, June 21, 1993 169(1), p.103-116, Refs. p.113-116.

Energy levels of whole soft body tissues and shells of the antarctic brachiopod *Liothyrella uva* (Jackson, 1912) were 9.0 and 1.1 kJ/g dry wt, respectively. The majority of the energy in the soft body tissues was attributable to NaOH-soluble protein (17.4% dry wt) and in the shell to lipid (2.6% dry wt). An intact individual with a shell length of 3.4 cm and a wet and dry wt of 5.8 and 2.9 g, respectively, contained a total of 9.6 kJ. As dense populations of *L. uva* occur in the southern ocean, this species represents a considerable potential energy resource for predators, including sea stars and fish. Total crude extracts of whole brachiopod soft tissues caused significant retraction of sensory tube-feet in 6 species of sympatric sea stars. Bioactivity was diminished in frozen extracts of brachiopod soft tissues exposed to the sensory tube-feet of the sea star *Odontaster validus*, but was not diminished in the tube-foot retraction response of the sea star *Neosmilaster georgianus*. Lyophilized brachiopod soft tissues ground into a fine powder and embedded at a concentration of 2% in agar pellets containing 5% krill caused significant feeding deterrence in an allopatric fish. These findings suggest that, as with temperate zone and tropical brachiopods, body tissues of this antarctic brachiopod are unpalatable to potential predators. (Auth. mod.)

B-48951

Roccatagliata, D., Heard, R.W., ***Diastylopsis goekei*, a new species (Crustacea: Cumacea: Diastylidae) from antarctic waters**, *Biological Society of Washington. Proceedings*, Dec. 18, 1992 105(4), p.743-752, Refs. p.751-752.

Specimens of *Diastylopsis goekei*, n.sp. were collected at depths ranging from 2 to 399 m in the Weddell Sea, the Ross Sea, and along the Antarctic Peninsula. *D. goekei* is most closely related to two other subantarctic-antarctic species, *D. annulata* (Zimmer, 1902) and *D. dentifrons* (Zimmer, 1903). *D. goekei* can be distinguished from these and all other members of the genus by the following combination of characters: carapace with 8-9 transverse ridges, ocular lobe with 2 teeth, first and second ridges with a row of mid-dorsal teeth (absent

in adult male), second ridge with a tooth on each side of frontal lobe, pseudorostral lobes with an arch of teeth, appearing as a conspicuous lateral serration when viewed dorsally, and telson longer than the peduncle of the uropod. The taxonomic status of several species of the genus *Diastylopsis* is briefly discussed. (Auth.)

B-48952

Veit, R.R., Silverman, E.D., Everson, I., **Aggregation patterns of pelagic predators and their principal prey, antarctic krill, near South Georgia, *Journal of animal ecology*, 1993 62(3), p.551-564, Refs. p.563-564.**

The spatial distributions of pelagic seabirds and fur seals near South Georgia, and to what extent the distributions of these predators were influenced by the spatial distribution of their principal prey, antarctic krill, was examined. One novel aspect of this analysis is an explicit consideration of the separation in space between swarms of krill and aggregations of predators that feed upon krill. The data were collected in Feb. 1986, during a systematic shipboard survey of the waters surrounding Bird I. Predator abundance was estimated visually using strip transects, and krill abundance was simultaneously estimated using a hull-mounted echosounder. The difficult analytical problems associated with spatial distributions of organisms were approached by using spatial autocorrelation and cross-correlation analysis, regression models with spatial terms, and randomization tests. Pelagic birds and seals were distributed in a strikingly non-random fashion at sea near South Georgia; their distributional patterns were strongly influenced by the distribution of krill swarms. Differences among predators in their spatial distribution and in their response to krill swarms suggest interspecific differences in foraging strategies. (Auth. mod.)

B-48954

Bowser, S.S., Alexander, S.P., Stockton, W.L., DeLaca, T.E., **Extracellular matrix augments mechanical properties of pseudopodia in carnivorous foraminiferan *Astrammia rara*: role in prey capture, *Journal of protozoology*, Nov.-Dec. 1992 39(6), p.724-732, Refs. p.731-732.**

The seemingly delicate, strand-like pseudopodia of *Astrammia rara*, a carnivorous benthic foraminiferan, adhere to and withstand the rigorous movements of meiofaunal prey. Previous electron microscopic studies identified two novel structures that might account for the unusual tensile properties of these pseudopodia: an extensive coiled microtubule cytoskeleton, and a fibrous extracellular matrix vesting the pseudopodial surface. In the present study it was found that pseudopodial networks microsurgically removed from *A. rara*'s cell body captured *Artemia* metanauplii as efficiently as intact organisms. The role of microtubules and extracellular matrix components in augmenting pseudopodial strength was tested. Agents that specifically disassemble microtubules or generally disrupt pseudopodial integrity failed to inhibit prey capture. All of these treatments left the extracellular matrix intact as revealed by immunofluorescence and scanning electron microscopy. The elastic and tensile properties of the extracellular matrix, isolated by solubilization of pseudopodial cytoplasm using the nonionic detergent Triton X-100, were similar to those of intact pseudopodial networks when assayed with calibrated microneedles or a flexible rubber substrate. These observations indicate that *A. rara* uses a fibrous extracellular matrix to augment its cytoplasmic tensile properties. (Auth. mod.)

B-48955

Bowser, S.S., Bernhard, J.M., **Structure, bioadhesive distribution and elastic properties of the agglutinated test of *Astrammia rara* (Protozoa: Foraminiferida), *Journal of eukaryotic microbiology*, Mar.-Apr. 1993 40(2), p.121-131, Refs. p.130-131.**

The fine structure, elastic properties, and distribution of the fibrous, meshlike cement (bioadhesive) were studied for the test of the

antarctic agglutinated foraminiferan *Astrammia rara*. Grain-size analysis of particles incorporated into the test compared with adjacent sediment indicates that *A. rara* is grain-size selective. Fractured tests curl inward, suggesting that the test is under tension—an impression substantiated by micromanipulation observations. Changes in test appearance were examined by scanning electron microscopy after sequential chemical treatments combined with ultrasonication. Organic fibrils securing fine-grained particulates on the test exterior were removed during initial sonication. A veil of fibrous organic material lining the test interior was removed by treatment with a nonionic detergent, revealing ligamentous cables of bioadhesive securely joining large grains. Observations indicate that the seemingly simple spherical architecture of *A. rara*'s test is in fact quite complex, consisting of large grains compressed by tensile cables of a proteinaceous bioadhesive, with additional rigidity supplied by fine particulate "mortar" deposited externally. (Auth. mod.)

B-48958

Trathan, P.N., **Spatial variability of antarctic krill in relation to mesoscale hydrography, *Marine ecology progress series*, Aug. 5, 1993 98(1-2), p.61-71, 26 refs.**

To examine the mesoscale distribution of antarctic krill, length frequency and maturity stage data were subjected to multivariate analysis. The results showed that the population was heterogeneous with respect to size and maturity, with small immature krill found primarily inside the Bransfield Strait and large mature krill mainly north of the South Shetland Is. Multivariate analysis of hydrographic data collected at the same stations revealed that the oceanography corresponded to previous classifications of the area, with Weddell Sea water in the southeast and east and eastern South Pacific water in the northwest. Further multivariate analysis using both krill variability and hydrographic data showed that a strong correlation existed between the krill distribution and the oceanography. Several hypotheses to explain the observed distribution of krill are discussed. It is judged that neither simple processes, such as growth during the sampling period, nor processes whereby krill are advected passively through the area by water movement, can completely explain the observed distribution. Instead, it is concluded that the observed gradient of krill size and maturity probably arises, at least in part, from an active ontogenetic migration. (Auth.)

B-48959

Öresland, V., Ward, P., **Summer and winter diet of four carnivorous copepod species around South Georgia, *Marine ecology progress series*, Aug. 5, 1993 98(1-2), p.73-78, 14 refs.**

The natural summer and winter diets of adult female *Euchaeta antarctica*, *E. farrani*, *E. rasa* and *E. biloba*, as well as male and female copepod stage V *E. antarctica*, were compared through gut content analyses. Copepods of variable size dominated the diet of all predators during both seasons (46 to 99% of all food items). Mean number of prey per predator (0.9 to 8.6), as well as the distribution of predators with different numbers of prey in the gut, indicated no general decrease in feeding by *Euchaeta* spp. during the antarctic winter. Diet of adults was broad and overlapping in both seasons. During summer, copepod nauplii and the small copepods *Drepanopus forcipatus* and *Oithona* spp. dominated the diet of CV *E. antarctica* in the upper 200 m. Nauplii were hardly taken at all by adult *E. antarctica* in that depth interval. During winter, *D. forcipatus* dominated the diets of both CV and adult *E. antarctica*, and of *E. biloba*. Among CV female *E. antarctica* 13% of individuals took 44% of all food items during winter. This emphasizes the patchy nature of feeding in the sea, and indicates the importance of adequate sampling scales and sample size in feeding studies. (Auth.)

B-48960

Arrigo, K.R., Robinson, D.H., Sullivan, C.W., **High resolution study of the platelet ice ecosystem in McMurdo Sound, Antarctica: photosynthetic and bio-optical characteristics of a dense microalgal bloom**, *Marine ecology progress series*, Aug. 5, 1993 98(1-2), p.173-185, 55 refs.

Microalgal absorption, biomass, and photophysiology were monitored in conjunction with the vertical attenuation of photosynthetically active radiation and spectral irradiance within the lower congelation ice and the platelet ice layer in McMurdo Sound in 1989. Between 89 and 99% of the algal biomass was located within the 0.68 m thick platelet layer where standing crop, measured as chlorophyll *a*, increased from 280 to 1090 mg/sq m between Oct. 26 and Dec. 3. Algal biomass was highly stratified within the platelet ice layer. An increasing fraction, 38 to 90%, of integrated chl *a* was collected from the upper 0.125 m of the platelet layer, near the base of the congelation ice. Algal pigments accounted for over 96% of total light attenuation (ice + particles) within this layer. Sea ice microalgae exhibited photosynthetic properties consistent with extreme shade adaptation, including low mean pigment-specific absorption, and low assimilation numbers both of which declined with depth. Vertical profiles revealed that low quantum yields for platelet ice assemblages were not a function of low temperature, as had previously been suspected, but vary with depth and hence light level. Microalgae at the platelet ice surface appeared well adapted to the ambient light field, while algae at depth appeared to retain excess photosynthetic capacity. (Auth. mod.)

B-48964

Rodhouse, P.G., **Cephalopod prey of the southern elephant seal, *Mirounga leonina* L., Canadian journal of zoology**, May 1992 70(5), p.1007-1015, 47 refs.

In the austral summers of 1986 and 1988-1989, 51 southern elephant seals at Husvik, South Georgia, were stomach lavaged after chemical immobilization. Only cephalopod remains were retrieved, including 1070 lower beaks that were identified and measured. In total these were estimated to represent a wet weight of 187.8 kg. Larger seals of both sexes fed on a wider variety of cephalopod species than smaller seals, with large males taking the greatest diversity. Between the two summers of the study there were some changes in the relative importance of the various cephalopod species consumed; in particular, in 1988-1989 *M. knipovitchi* and *M. hyadesi* were less important and *P. glacialis* was more important. The taxa and size of cephalopods taken by southern elephant seals at South Georgia are almost identical to those taken by the grey-headed albatross (*Diomedea chrysostoma*), but the relative proportions are quite different. The biogeography of the cephalopods eaten suggests that southern elephant seals sampled at South Georgia do not forage to the north of the Antarctic Polar Front but probably travel southwards towards the Antarctic Continent or Peninsula. (Auth. mod.)

B-48971

Gremmen, N.J.M., Huiskes, A.H.L., Francke, H.W., **Ecology of lichens in the coastal regions of the Argentine Islands, Antarctic Peninsula—a preliminary report**, *Circumpolar journal*, 1991 6(1-2), p.3-10, 4 refs.

During the 1990/91 season the ecology and ecophysiology of some coastal lichens, algae and mosses were studied in the region of the Argentine Is. The influence of site characteristics, especially salinity and nutrient status, was studied by observing the species composition of vegetation in some 180 50x50 cm sample plots. For each plot, data on site characteristics were collected. In a number of *Mastodia tessellata* stands biomass was determined. Water content of lichen thalli was studied in the field as well as in the laboratory. Desiccation rates in an atmosphere of 40% r.h. at ca 14 C were measured, as well as water uptake from a saturated atmosphere. Field water

contents were related to microclimatic data. Influence of light, temperature, humidity, salinity and nutrients on the photosynthetic rates of *M. tessellata* and some other species was studied using infrared gas analysis. (Auth.)

B-48980

McMinn, A., Hodgson, D., **Summer phytoplankton succession in Ellis Fjord, eastern Antarctica**, *Journal of plankton research*, Aug. 1993 15(8), p.925-938, 22 refs.

Spring phytoplankton communities in the water column of Ellis Fjord are characterized by diatoms originating from the bottom sea-ice strand community. Upon ice break-out in early summer, these are replaced by blooms of the phytoflagellates, *Phaeocystis pouchetii*, *Cryptomonas cryophila*, *Pyramimonas gelidicola*, silicoflagellates and dinoflagellates. The narrow entrance of the fjord and the development of summer stratification are probably limiting the availability of nutrients and hence the magnitude of the small bloom (maximum 2.8 million cells/l). (Auth.)

B-48981

Voisin, J.F., **Case 2784: *Procellaria gigantea* Gmelin, [1789] (currently *Macronectes giganteus*; Aves, Procellariiformes): proposed conservation of usage of the specific name by designation of a neotype**, *Bulletin of zoological nomenclature*, June 1992 49(2), p.140-143, 25 refs.

The purpose of this application is to conserve the current universal understanding and usage of the specific names of *Macronectes giganteus* (Gmelin, [1789]) and *M. halli* Mathews, 1912 for the southern, antarctic and more northern subantarctic species of giant petrel respectively (family Procellariidae). The name *giganteus* (type species of the genus *Macronectes* Richmond, 1905) was based on a description of the second species. It is proposed that a neotype for *giganteus* be designated. (Auth.)

B-48982

Imber, M.J., **Cephalopods eaten by wandering albatrosses (*Diomedea exulans* L.) breeding at six circumpolar localities**, *Journal of the Royal Society of New Zealand*, Dec. 1992 22(4), p.243-263, 47 refs.

The beaks of 9,994 cephalopods of 61 species, obtained mainly from chick regurgitations of wandering albatrosses at Gough, Auckland, Antipodes, Prince Edward and Macquarie Islands and South Georgia, were used to specify and calculate the biomass of cephalopods consumed. Histioteuthidae were most important by numbers and biomass at Gough I. (in warmest seas), but Onychoteuthidae increasingly superseded them southwards; *Kondakovia longimana* formed 59 to 75% of biomass eaten at the three localities nearest the Antarctic Polar Front. Other important families were Octopoteuthidae, Cranchiidae, Architeuthidae (juveniles) and Ommastrephidae (South Georgia only). Wandering albatrosses rearing chicks can forage at least to 3,000 km in a single foray, and may exploit an important food source some 1200 km from the nest (as in the probable commensalism of South Georgia birds with the Falkland Is. fishery). They feed, sometimes opportunistically, on cephalopods active or moribund at the surface, or discarded or lost by trawlers, cetaceans or seals. Vertically migrating cephalopods, especially bioluminescent species, are disproportionately frequent in their non-commensal diet, suggesting that they often feed at night. (Auth. mod.)

B-48983

Crame, J.A., **Latitudinal range fluctuations in the marine realm through geological time**, *Trends in ecology and evolution*, May 1993 8(5), p.162-166, 35 refs.

The concept of polar marine faunas as having evolved in comparative isolation over long periods may need to be revised. New evi-

dence from the southern ocean in particular suggests that a number of taxa may have had connections with lower-latitude regions in the comparatively recent past. Opportunities for high-low latitude faunal interchange were enhanced considerably by reduced meridional temperature gradients over the greater part of the last 100 million years. Indeed, such is the nature and scope of past latitudinal range fluctuations that they could be major determinants of regional patterns in taxonomic diversity. Paleotemperature data on antarctic waters are included. (Auth. mod.)

B-49000

Madureira, L.S.P., Everson, I., Murphy, E.J., **Interpretation of acoustic data at two frequencies to discriminate between antarctic krill (*Euphausia superba* Dana) and other scatterers**, *Journal of plankton research*, July 1993 15(7), p.787-802, 28 refs.

A visual classification was carried out of echo trace characteristics derived from 113 integration intervals of 1 nautical mile each taken from the southern ocean in the area of South Georgia. This separated the echo traces into five categories: three biotic and two abiotic in origin. The acoustic data were subsequently analyzed in detail by comparing the acoustic parameter Mean Volume Backscattering Strength (MVBS) at 120 kHz with that at 38 kHz. The three biotic categories separated visually had significantly different mean *delta* MVBS values (*delta*MVBS = MVBS 120 kHz - MVBS 38 kHz). To investigate if the biotic categories could be identified solely on the basis of *delta*MVBS values, maximum-likelihood techniques were used to analyze the multimodal distribution of a further 1286 *delta*MVBS records. These analyses allowed ranges to be defined for *delta*MVBS which separate three biotic categories. On the basis of the target strength properties of the most likely scatterers in the region, the three categories were identified as krill, organisms larger than krill (fish or squid) and organisms smaller than krill (small zooplankton). The acoustic techniques described in this paper indicate a useful methodology in the study of southern ocean pelagic organisms. (Auth.)

B-49009

Adams, N.J., Moloney, C., Navarro, R., **Estimated food consumption by penguins at the Prince Edward Islands**, *Antarctic science*, Sep. 1993 5(3), p.245-252, Refs. p.251-252.

The consumption of food by the four species of breeding penguins at the Prince Edward Is. is assessed on an annual and seasonal basis. Total annual food consumption was estimated at 880,000 t, of which king penguins accounted for 74%, macaroni penguins 21%, rockhopper penguins 5% and gentoo penguins <1%. Pelagic fish, almost entirely myctophids, were the most important prey (70% of total prey biomass), followed by pelagic crustaceans (18%) and cephalopods (11%). Demersal fish and benthic crustaceans accounted for <1% of total consumption, being consumed only by gentoo penguins. Peak demands occurred from Oct.-Dec. when three of the four species were breeding, including the two demi-populations of king penguins. Food demand decreased during winter when only king and gentoo penguins were present. Much of the prey are presumably captured within 300 km of the islands. The importance of pelagic myctophid fish to penguin populations at the Prince Edward Is. is evident. (Auth. mod.)

B-49010

Brey, T., Clarke, A., **Population dynamics of marine benthic invertebrates in antarctic and subantarctic environments: are there unique adaptations?**, *Antarctic science*, Sep. 1993 5(3), p.253-266, Refs. p.264-266.

Data on the growth (20 species) and productivity (19 species) of antarctic and subantarctic macrobenthos were compiled from published and unpublished sources. Differences in the production/biomass (P/B) ratio between antarctic, arctic and non-polar populations

were examined using a set of 363 data arrays (327 non-polar, 26 antarctic, 10 arctic). Each array contained annual P/B ratio, mean individual body mass, geographical latitude, water depth, bottom water temperature and the nominal variables TAXON (Mollusca, Crustacea, Polychaeta, Echinodermata) and REGION. The P/B ratio was found to vary with body mass, taxon, temperature and water depth. P/B ratios of antarctic and arctic populations were significantly lower than those of non-polar populations. For antarctic populations this difference could be explained completely by the effects of temperature and water depth. The strikingly high biomass of many antarctic benthic communities is probably related to adaptations to low and oscillating food levels, and particularly to the low maintenance energy requirement associated with the low ambient temperature. (Auth.)

B-49011

Franzmann, P.D., Dobson, S.J., **Phylogeny of bacteria from a modern antarctic refuge**, *Antarctic science*, Sep. 1993 5(3), p.267-270, 28 refs.

The 16S rRNAs of nine new species of prokaryotes, which had been isolated from four lakes of the Vestfold Hills, have been sequenced. These sequences were compared with those of their closest taxonomic relatives obtained from publicly available databases. The antarctic species were of wide diversity, with representatives from the domains *Archaea* and *Bacteria* (*sensu* Woese). Generally, they were most closely related to organisms from marine environments. The sequence dissimilarity between the rRNA sequences of the antarctic strains and their nearest known relatives suggests they diverged from each other much earlier than the establishment of their modern antarctic habitat. The conserved nature of the 16S rRNA molecule suggests it may not be as useful for detecting evolutionary change in antarctic prokaryotes as distinct from non-antarctic prokaryotes. Although the optimal temperature for growth of each species is well above the temperature of its environment, each has a reduced optimal temperature for growth when compared with its taxonomic counterpart from non-antarctic environments. (Auth.)

B-49012

Nichols, D.S., Nichols, P.D., Sullivan, C.W., **Fatty acid, sterol and hydrocarbon composition of antarctic sea ice diatom communities during the spring bloom in McMurdo Sound**, *Antarctic science*, Sep. 1993 5(3), p.271-278, 26 refs.

The lipid composition of microalgal communities dominated by diatoms collected from the sea ice at three locations within McMurdo Sound during the austral spring bloom of 1989/90 was determined, using gas chromatography (GC) and GC mass spectrometry. A range of C27-C29 sterols were detected. The major sterols found at the three sites were 24-methylcholesta-5,22E-diene-3beta-ol (Cape Armitage); *trans*-22-dehydrocholesterol, 24-ethylcholesterol and 24-methylenecholesterol (Erebus Ice Tongue); and 24-methylenecholesterol (Cape Royds). The difference in sterol profiles is believed to reflect the differing species composition at each site. The high relative levels (as % of total) of 24-ethylcholesterol at the Erebus Ice Tongue site (possibly related to *Amphiprora kufferathii*) supports the proposal that diatoms are a more probable source of C29 sterols in antarctic lakes than are other algal groups or cyanobacteria. Changes in sterol composition over the course of the bloom were evident at Cape Armitage, particularly within the cellular free-lipid fraction. A C25:2 isoprenoid hydrocarbon was present in samples from all sites, adding further evidence to the proposal that diatoms are probably a source of this and related isoprenoid alkenes in marine and coastal sediments. (Auth. mod.)

B-49013

Riemann, F., Schaumann, K., **Thraustochytrid protists in antarctic fast ice?**, *Antarctic science*, Sep. 1993 5(3), p.279-280, 14 refs.

Sea ice provides a habitat for a conspicuous and productive assemblage of autotrophic microalgae and for heterotrophs ranging from bacteria to vertebrates. With the exception of a reference to chytridiaceous fungi that were found infecting arctic ice diatoms, and a note in a cruise report, it appears that fungi and similar organisms have until now not been mentioned as members of the heterotrophic sea ice community. The authors report on the abundant occurrence of apparently thraustochytrid fungus-like protists associated with mucilage tubes of pennate diatoms, encountered in the lower section of a fast ice core drilled close to the southern shelf ice margin of the Weddell Sea. (Auth. mod.)

B-49021

Yang, H.F., McTaggart, A.R., Davidson, A., Burton, H., **Natural productivity of acrylic acid and dimethyl sulphide during a summer bloom of *Phaeocystis pouchetii* in antarctic coastal water**, *Antarctic research*, June 1992 3(1), p.31-39, 9 refs.

Water samples were collected during the *Phaeocystis pouchetii* bloom period beginning in Nov. 1988, in 15 m water column, from 10 km offshore of Davis Station. The concentrations of acrylic acid and dimethyl sulphide (DMS) were determined by HPLC and GC. Results show that the concentration of acrylic acid varies from 0.001-0.50 micromol/l and the concentration of DMS from 0.003-0.588 micromol/l during *P. pouchetii* bloom. Both compounds increased in late Dec. and reached their highest concentration in early Jan. 1989, then decreased rapidly and returned to lower levels from mid-Jan. to Feb., in agreement with variation in cell number of the unicell alga *P. pouchetii*. The correlation coefficients between acrylic acid and *P. pouchetii* and between DMS and *P. pouchetii* are both 0.998. It is clear that *P. pouchetii* produces acrylic acid and DMS. A cellular product, dimethylsulphonium propionate (DMSP), is decomposed into acrylic acid and DMS, and the formation of DMSP is probably from methionine which could be utilized by *P. pouchetii*. (Auth. mod.)

B-49036

Magazzu', G., Saggiomo, V., Decembrini, F., **Primary production in the Straits of Magellan**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.89-154, 4 refs.

Following a discourse on the uniqueness of the Strait of Magellan and the relatively little that is known of its oceanography and ecosystems, the sampling program for biomass study is described. Within ten minutes of arrival on deck, samples are prepared and analyzed for light and dark effects. Biomass is calculated in a scintillator with counts being repeated four times. Alkalinity is measured and CO₂ is determined. Results are displayed in sets of tables and graphs.

B-49037

Fabiano, M., Povero, P., Danovaro, R., Bruzzone, R., **Biochemical composition of particulate organic matter in the Straits of Magellan**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.155-167, 12 refs.

Research into the oceanography of the Strait of Magellan was undertaken to compare conditions in the Strait with the characteristics of the subantarctic and antarctic ecosystems. Chemical parameters analyzed are: total suspended matter, proteins, carbohydrates, lipids, nucleic acids, elemental organic carbon and nitrogen.

B-49038

Hecq, J.H., Veeschkens, C., Goffart, A., **Results of phytopigments analysis by high performance liquid chromatography during the oceanic cruise in the Straits of Magellan (Feb.-Mar. 1991)**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.169-193, 3 refs.

The research aims to determine the level of exchanges between basins in the Strait by using biomarkers such as phytopigment assemblages. Pigments measured include chlorophylls *a*, *a prime*, *a double prime*, *c1 + c2* and *c3*, phaeophytins, phaeophorbids *a*, *b*, *c*, beta carotene, and diverse other known and unknown pigments.

B-49094

Rakusa-Suszczewski, S., **Respiration of *Nacella concinna* Strebel 1908 from the intertidal zone of Admiralty Bay (South Shetland Islands, Antarctica)**, *Polskie archiwum hydrobiologii*, 1992 39(2), p.205-209, 12 refs.

In the intertidal zone of Admiralty Bay the water temperature ranges from -1.8 to 5.0 C, but in the rockpools it can reach over 11 C. *N. concinna* oxygen consumption, calculated using the wet weight (including the shell), may change over 24 hours in summer from 0.038 cu mm O₂/mg/hr at -1.8 C, to 0.113 cu mm O₂/mg/hr at 10 C, and is dependent on the specimen weight to the power of 0.8. The respiration rate is higher in submerged limpets than in exposed ones. (Auth.)

B-49103

Men'shenina, L.L., Rakusa-Suszczewski, S., **Zooplankton changes during the year in Admiralty Bay (February 1990-January 1991)**, *Polskie archiwum hydrobiologii*, 1992 39(1), p.65-76, With Polish summary. 37 refs.

Temporal changes in plankton were followed in samples from the central part of Admiralty Bay, taken throughout the 400 m water column from Feb. 21, 1990 to Jan. 15, 1991. Samples were collected by means of vertical hauls from the bottom to the surface with a plankton net, WP-2 of 0.5 sq m opening and 200 micron mesh size. Changes in the abundance of mass plankton species are discussed along with general changes in the community. The latter were investigated with a new cluster analysis method. The community changes are connected with seasonal succession as well as water inflow to the bay from Bransfield Strait. The biological spring (Sep.) is the only distinctly expressed transition period in the seasonal state of the community. All other seasons are characterized by smooth transition from one to the next. (Auth. mod.)

B-49105

Chappell, M.A., **Diving behavior during foraging in breeding Adélie penguins**, *Ecology*, June 1993 74(4), p.1204-1215, 32 refs.

Electronic time depth recorders were used to examine diving patterns of Adélie penguins breeding near Palmer Station. Most hunting dives consisted of a rapid descent to depth, a period of bottom time at near-constant depth, and a rapid ascent to the surface. Most hunting activity occurred in bouts of consecutive dives to similar depths. Adélies foraged at depths between 3 and 98 m, with a mean of 26 m. Descent and ascent rates averaged 1.2 and 1.1 m/s, respectively. Foraging was primarily diurnal, but there was relatively little circadian change in foraging depth. The birds' overall hunting effort (cumulative bottom time) was concentrated between 0500 and 2100 h at depths between 10 and 40 m. Dive duration was positively correlated with dive depth. Maximum dive duration was 160 s; most hunting dives lasted 60-90 s with a mean of 73 s. Post-dive surface intervals averaged 50% of dive duration. Time-use efficiency during

dive bouts decreased with increasing dive depth. Estimates of oxygen stores and diving metabolic rates indicate that the aerobic dive limit of Adélies is 46-68 s and that most hunting dives require some anaerobic metabolism. Use of anaerobiosis engenders an energy penalty and probably affects both the behavior and energetics of foraging. (Auth. mod.)

B-49106

Wartzok, D., **Under-ice movements and the sensory basis of hole finding by ringed and Weddell seals**, *Canadian journal of zoology*, Sep. 1992 70(9), p.1712-1722, With French summary. 30 refs.

Arctic ringed seals and antarctic Weddell seals were tracked using an attached acoustic tag during their under-ice movements at isolated experimental sites with varying numbers of novel breathing holes. Both natural and artificial visual landmarks were used by the seals during their dives. Seals deprived of vision through blindfolding greatly restricted their diving. Blindfolded seals responded to supplied acoustic cues and moved toward them. Prior to swimming toward an acoustic cue, the animals often swam at an angle to the direct line to the source of the acoustic cue. This movement could have provided information on the distance to the source of the sound. After executing this presumed ranging behavior, the seals swam directly toward the acoustic cue up to 4 km away. The contribution of vibrissal sensation to location of an open hole was investigated in blindfolded ringed seals. Seals farther than 1 m from an open hole were unable to find the hole without an acoustic cue. Vibrissal sensation apparently contributed to centering the blindfolded ringed seal within a breathing hole, but not to locating the hole. Weddell seals were able to maintain straight-line tracks for several hundred meters out from and back to a hole, were able to follow the same path on subsequent trips separated by up to 64 h, and continued using established routes between holes even though shorter direct routes were available. (Auth. mod.)

B-49107

Alkemade, R., Van Rijswijk, P., **Path analyses of the influence of substrate composition on nematode numbers and on decomposition of stranded seaweed at an antarctic coast**, *Netherlands journal of sea research*, Mar. 1993 31(1), p.63-70, 18 refs.

Large amounts of seaweed are deposited along the coast of Admiralty Bay, King George I. The stranded seaweed partly decomposes on the beach and supports populations of meiofauna species, mostly nematodes. The factors determining the number of nematodes found in the seaweed packages were studied. Seaweed/sediment samples were collected from different locations along the coast near Arctowski Station, covering gradients of salinity, elevation and proximity of penguin rookeries. On the same locations, decomposition rate was determined by means of permeable containers with seaweed material. Models, including the relations between location, seaweed and sediment characteristics, number of nematodes and decomposition rates, were postulated and verified using path analysis. The number of nematodes was directly correlated with the height of the location, the carbon-to-nitrogen ratio, and the salinity of the sample. Nematode numbers were apparently indirectly dependent on sediment composition and water content. Analysis of the relation between decomposition rate and abiotic location-related characteristics showed that decomposition rate was dependent on the water content of the stranded seaweed and sediment composition. Decomposition rates were high at locations where water content of the deposits was high. (Auth. mod.)

B-49110

Culik, B.M., Wilson, R.P., Bannasch, R., **Flipper bands on penguins: what is the cost of a life-long commitment**, *Marine ecology progress series*, Aug. 19, 1993 98(3), p.209-214, 40 refs.

Hundreds of thousands of birds are annually ringed worldwide. Unfortunately, researchers all too often tend to neglect problems associated with rings and tags. In antarctic penguins, flipper bands have been used extensively by a variety of nations, and banding is an integral part of the CCAMLR monitoring program. This program suggests that mortality in penguins wearing bands can be attributed to either (a) prey species availability, (b) predation, (c) weather conditions or (d) other. In this paper the goal is to quantify energetic costs associated with wearing a flipper band. For that purpose, freshly caught Adélie penguins ($n=7$) were introduced in Antarctica into a 21 m long still-water tunnel, where their behavior and energy consumption were determined via observation and gas respirometry. Birds were either immediately marked with a flipper band and tested in the tunnel for ca 2 h, and then taken out and tested again after removal of the band, or vice-versa. Flipper bands significantly increased the power input of Adélie penguins during swimming by 24% over the speed range of 1.4 to 2.2 m/s, from 17 W/kg to 21.1 W/kg ($n=115$ and 157 measurements, respectively). The implications of banding on foraging performance and survival of penguins are discussed. Implantable passive transponders could help overcome such problems. (Auth. mod.)

B-49111

Kurbjewit, F., Gradinger, R., Weissenberger, J., **Life cycle of *Stephos longipes*--an example of cryopelagic coupling in the Weddell Sea (Antarctica)**, *Marine ecology progress series*, Aug. 19, 1993 98(3), p.255-262, 57 refs.

Distribution, abundance and age composition of the calanoid copepod *Stephos longipes* (Giesbrecht) were studied in the southeastern Weddell Sea in Jan.-Feb. 1991. Samples were taken in the water column down to 1000 m. Concurrent samples were taken from drifting ice floes and from a 1 m deep layer underneath the pack ice (under ice water layer: UIWL). *S. longipes* was the predominant calanoid copepod at most stations throughout the continental shelf area within the upper 50 m of the water column. Generally, abundances inside the pack ice floes exceeded those in the UIWL by 1 to 3 orders and the water column below by 3 to 5 orders of magnitude respectively. The mean population stage was lowest inside the ice floes, followed by the UIWL and the water column. Also, nauplii and young copepodite stages (CI and CII) often outnumbered all other metazoan groups within and beneath the ice. Highest densities of *S. longipes* were observed in ice floes and UIWL samples where platelet ice was particularly frequent. Fecal pellets of *S. longipes*, collected in the UIWL, were in most cases filled with sea ice algae. The life cycle of *S. longipes* is closely associated with the sea ice, especially platelet ice layers, where a high algal standing crop can sustain a sufficiently high secondary production in an otherwise food-limited habitat. Thus *S. longipes* uses a completely different strategy than large calanoid copepods in the Antarctic which do not inhabit sea ice at any given time during their life cycle. (Auth. mod.)

B-49112

Rodhouse, P.G., Prince, P.A., **Cephalopod prey of the black-browed albatross *Diomedea melanophrys* at South Georgia**, *Polar biology*, Aug. 1993 13(6), p.373-376, 17 refs.

Regurgitations were collected from 41 black-browed albatross adults feeding chicks at Bird I., South Georgia in Feb. 1986. The samples were sorted into recognizable food categories and weighed. Cephalopods were identified by means of the lower beak, or in some cases the gladius, and allometric equations were used to calculate mantle length and wet body weight represented by beaks. The samples contained 35.5% *Euphausia superba*, 30.9% cephalopods and 27.1% fish, by weight. The presence of almost complete undigested specimens of *Martiala hyadesi* in the bird's diet indicates that it occurs relatively close to South Georgia. *M. hyadesi* preys largely on myctophid fishes, which themselves prey on small zooplankters, so a significant component of the black-browed albatross diet depends on a

food chain which largely bypasses *E. superba*. This study compares the diet with a study carried out ten years earlier, and establishes the identity of ommastrephid squids in the diet of black-browed albatrosses. (Auth. mod.)

B-49113

Lancelot, C., Mathot, S., Veth, C., De Baar, H., **Factors controlling phytoplankton ice-edge blooms in the marginal ice-zone of the northwestern Weddell Sea during sea ice retreat 1988: field observations and mathematical modelling**, *Polar biology*, Aug. 1993 13(6), p.377-387, 50 refs.

The factors controlling phytoplankton bloom development in the marginal ice zone of the northwestern Weddell Sea were investigated during the EPOS (Leg 2) expedition, 1988. Measurements were made of physical and chemical processes and biological activities associated with the process of ice-melting and their controlling variables, particularly light limitation mediated by vertical stability and ice-cover, trace metal deficiency and grazing pressure. The combined observations and process studies show that the initiation of the phytoplankton bloom, dominated by nanoplanktonic species, was determined by the physical processes operating in the marginal ice zone at the time of ice melting. The additional effects of grazing pressure by protozoa and deep mixing appeared responsible for a rather moderate phytoplankton biomass (4 mg Chl *a*/cu m) with a relatively narrow geographical extent (100-150 km). The role of trace constituents, in particular iron, was minor. The magnitude and extent of the ice-edge bloom is determined by the combined action of meteorological conditions and grazing pressure. Persistent violent wind conditions (> 14 m/s) are shown to prevent blooms from developing even during the brightest period of the year. (Auth. mod.)

B-49114

Hopkins, T.L., Ainley, D.G., Torres, J.J., Lancraft, T.M., **Trophic structure in open waters of the marginal ice zone in the Scotia-Weddell confluence region during spring (1983)**, *Polar biology*, Aug. 1993 13(6), p.389-397, 39 refs.

The structure of the food web was investigated in open waters adjacent to the marginal ice zone in the southern Scotia Sea in spring 1983. Diets were defined for dominant zooplankton, micronekton, and flying seabird species, and then aggregated by cluster analysis into feeding groups. Most zooplankton were omnivorous, feeding on phytoplankton, protozoans, and in some cases, small metazoans (copepods). Only two species were found to be exclusively herbivorous: *Calanoides acutus* and *Rhincalanus gigas*. Micronekton were carnivores with copepods being the dominant prey in all their diets. The midwater fish *Electrona antarctica* was the dominant food item in seven of the nine seabird species examined. Cephalopods, midwater decapod shrimps and carrion were also important in the diets of a few seabird species. A scheme is presented that describes the major energetic pathways through the open water ecosystem from phytoplankton to apex predators. At the base are phytoplankton and protozoans which are the principal food resource for the biomass copepods and krill. Krill and the biomass copepods are the principal forage of the midwater fish *E. antarctica* which, in turn, is the central diet component of flying seabirds as well as important food for the antarctic fur seal and cephalopods, and the principal food of the minke whale. (Auth. mod.)

B-49115

Nichol, S., **Comparison of antarctic petrel (*Thalassoica antarctica*) diets with net samples of antarctic krill (*Euphausia superba*) taken from the Prydz Bay region**, *Polar biology*, Aug. 1993 13(6), p.399-403, 15 refs.

Samples of the stomach contents of antarctic petrels were obtained on board ship in the Prydz Bay region from birds which had

spontaneously regurgitated. The weight of food and the species composition of the stomach contents were measured. Antarctic krill, the sole prey item taken, were compared to krill obtained by nets in the same region as part of a large-scale krill survey. Krill from petrel stomach samples were larger in mean size than those sampled by nets. This may be attributed to selection of the larger sized krill by the petrels, it may be caused by the nets sampling different populations of krill, or it may be due to net avoidance by the larger krill. (Auth.)

B-49116

Fahl, K., Kattner, G., **Lipid content and fatty acid composition of algal communities in sea-ice and water from the Weddell Sea (Antarctica)**, *Polar biology*, Aug. 1993 13(6), p.405-409, 35 refs.

The lipid and fatty acid compositions of microalgae were investigated in sea-ice and water samples from six different habitats of the Weddell Sea. All sea-ice samples and ice-associated water contained high algal biomass dominated by centric and pennate diatoms. Cells partially filled with oil droplets and resting spores were found. The largest component of the lipids formed in the cells from the ice platelet layer triacylglycerols. The fatty acid composition of sea-ice microalgae was dominated by the 16:1(n-7), 16:0, 18:1(n-9) and 20:5(n-3) fatty acids. Except for 18:1, they are typical for diatom fatty acids. These fatty acids were most abundant in pieces of first year ice with a brown coloration ("brown ice") and in the water column directly below sea-ice (sub-ice water). The small amounts of non-diatom acids, as 22:6(n-3) and 18:4(n-3), clearly showed that the sea-ice communities were not purely composed of diatoms. The most striking difference, in comparison to the general fatty acid composition of diatoms, was the high proportion of the 18:1 fatty acid in all samples, which might be caused by detrital material or lipid accumulation within cells and resting spores. In general, no clear adaptation of the fatty acid composition to the antarctic and sea-ice environment was found. The fatty acid composition of the particulate matter from the water column was totally different from all other samples dominated by the saturated fatty acids 16:0 and 18:0. (Auth.)

B-49117

Crafford, J.E., Chown, S.L., **Respiratory metabolism of sub-antarctic insects from different habitats on Marion Island**, *Polar biology*, Aug. 1993 13(6), p.411-415, 30 refs.

Oxygen uptake of the foliage-dwelling larvae of *Embryonopsis halticella* Eaton (Lepidoptera: Yponomeutidae) and adults of *Ectemnorhinus marioni* Jeannel (Coleoptera: Curculionidae), the litter-dwelling larvae of *Pringleophaga marioni* (Lepidoptera: Tineidae) and the wrack-dwelling *Paractora dreuxi* Ségué (Diptera: Helcomyzidae) was examined over the range of temperatures experienced by these insects in their microhabitats on Marion I. With the exception of the kelp fly, *P. dreuxi*, Q10 and activation energies were generally lower than those found in temperate and arctic insects, but were similar to values found in beetles from sub-antarctic South Georgia I. Q10 and activation energy of each species reflected the temperature regime found in its microhabitat. Activation energies of the Marion I. species were intermediate between those found in temperate and polar arthropods, but towards the polar end of the range. The hypothesis that insects are capable of showing respiratory adaptation to temperature is supported. (Auth.)

B-49118

Garcia, F.J., Troncoso, J.S., Garcia-Gómez, J.C., Cervera, J.L., **Anatomical and taxonomical studies of the antarctic nudibranchs *Austrodoris kerguelenensis*, (Bergh, 1884) and *A. georgiensis* n.sp. from the Scotia Sea**, *Polar biology*, Aug. 1993 13(6), p.417-421, 19 refs.

During the Antartida 8611 expedition to the Scotia Sea, organized by the Spanish Oceanographic Institute, several specimens of

Austrodoris were collected. Although nearly all have been identified as *Austrodoris kerguelensis* (Bergh, 1884), one of them shows some anatomical features, mainly related to the reproductive system, that identifies this specimen as a new species, which the authors have named *A. georgiensis*. Therefore, with the aim of clarifying the taxonomical value of this species, a comparative study of the anatomy of *A. kerguelensis* and *A. georgiensis* is presented. Some new data on the diet of *A. kerguelensis* are also presented. (Auth.)

B-49119

Ernsting, G., **Observations on life cycles and feeding ecology of two recently introduced predatory beetle species at South Georgia, sub-antarctic**, *Polar biology*, Aug. 1993 13(6), p.423-428, 22 refs.

On South Georgia, two recently introduced species of predatory beetle, *Oofterus soledadinus* and *Trechisibus antarcticus* (Coleoptera, Carabidae), were studied over the period Nov. 1991-Apr. 1992. The study area comprised the coastal area around Stromness Bay, in particular the surroundings of the abandoned whaling station at Husvik. The study investigated the life cycle of both species and, for *T. antarcticus*, aspects of feeding. The occurrence of both teneral and gravid beetles was observed for the whole of the summer period. *T. antarcticus* appeared to be the more voracious predator of the two; its impact on other populations of soil animals may be large, as shown by its effect on the endemic detritivorous beetle *Hydromedion sparsutum* (Perimylopidae). (Auth.)

B-49120

Montgomery, J.C., Foster, B.A., Milton, R.C., Carr, E., **Spatial and temporal variations in the diet of nototheniid fish in McMurdo Sound, Antarctica**, *Polar biology*, Aug. 1993 13(6), p.429-431, 12 refs.

Specimens of 4 species of antarctic fish were captured at different locations in McMurdo Sound during the early summer, and for one species also during late winter. Stomach contents were analyzed to examine resource utilization across species, at different locations, and between late winter and early summer. The results are consistent with earlier findings that there is a gradation in resource utilization across these species. *Trematomus pennelli* and *T. bernacchii* tend to take predominantly benthic crawling prey, though they also take prey from the water column. *T. hansonii* and *T. nicolai* tend to take more prey from the water column, a tendency which can be related to the visual feeding vector of these species. Substantial differences in diet for the same species captured in different locations indicated significant flexibility in prey selection, which would allow utilization of spatial and temporal fluctuations in prey availability. Successful feeding by *T. bernacchii* in late winter is a further indication that this species can feed non-visually, and supports the notion that non-visual feeding mechanisms are likely to be of importance in the biology of the antarctic fishes. (Auth.)

B-49133

Sömme, L., Strömme, A., Zachariassen, K.E., **Notes on the ecology and physiology of the antarctic oribatid mite *Maudheimia wilsoni***, *Polar research*, June 1993 12(1), p.21-25, 17 refs.

The oribatid mite *Maudheimia wilsoni* Dalenius was found to be numerous on the underside of stones at Jutulssessen in Queen Maud Land. Daily temperature fluctuations of the microhabitat from as high as 19 C and to as low as -17 C were observed during the austral summer. Optimal activity of the mites occurred at 10 C. Even in Jan. the mean supercooling point of adult mites was as low as -30.8 C. Haemolymph osmolality ranged from 500 to 800 mOsmol and thermal hysteresis freezing points from -4.7 to -6.1 C. Adult mites had a mean water content of 43.6% and a water loss rate of 0.12 microgram/hr at 15 C and 10% relative humidity. (Auth. mod.)

B-49135

El-Sayed, S.Z., ed, **Reports of the national contributions to the BIOMASS program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, 292p., Refs. passim. For individual papers see B-49136 through B-49148.

This volume is a compendium of reports written by the BIOMASS National Correspondents summarizing the contributions of the participating countries to the BIOMASS Program. Each of the reports is appended with a list of BIOMASS-related publications.

B-49136

Marschoff, E., **Argentine contributions to BIOMASS**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.1-7, Publications p.4-7.

A number of institutions in the Argentine scientific community participating in programs developed through BIOMASS are listed, and the most important results obtained during the BIOMASS-oriented field work are outlined. A selection of publications discussing the main results is included.

B-49137

Marchant, H.J., **Report of Australia's involvement in the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.8-17, Publications p.12-17.

Marine biological research carried out on several Australian ships during the 1980s is summarized. BIOMASS related cruises and their dates are listed, as are BIOMASS meetings attended by Australian scientists and BIOMASS related publications, such as papers, technical reports, monographs, etc.

B-49138

De Broyer, C., **Belgian activities related to the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.18-26, Publications p.21-26.

BIOMASS related investigations carried out by Belgian teams dealing with plankton and benthos ecology, fish physiology and biochemistry, and marine geochemistry are outlined. A Belgian antarctic bibliography related to BIOMASS interests (1978-1991) is included.

B-49139

Brandini, F.P., **Contribution of Brazilian antarctic expeditions to the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.27-41, Refs. p.35-41.

The BIOMASS Program coincided more or less with the beginning of Brazilian operations in the Antarctic. Besides the sampling for the BIOMASS objectives, the Brazilian expeditions supported basic studies on trophic relationships among plankton communities, cytogenetics and biochemistry of krill and fishes, and taxonomy and abundance of phytoplankton, tintinnids, pelagic polychaetes and benthic organisms in the Bransfield Strait. Meteorological observations were also performed continuously on both SIBEX cruises.

These studies were extended to the post-SIBEX period, significantly improving biological oceanographic research in Brazil, with a total of 53 publications by 1990. (Auth. mod.)

B-49140

Eberhard, P., **Chilean contributions to the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.42-52, Publications p. 45-47.

This report summarizes the objectives and the results of selected areas of Chilean BIOMASS research and includes a list of 37 scientific papers derived from the work in the Antarctic. Some selections from the conclusions are also presented. The research was carried out mainly in the Bransfield Strait and Drake Passage, north of South Shetland Is.

B-49141

Wong, R., Dong, Z.Q., **National report on China's scientific research in the southern ocean relevant to the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.53-72, Publications p.67-72.

Although China was not a formal participant in the BIOMASS Program, four cruises were undertaken in the southern ocean designed to carry out BIOMASS-related investigations on antarctic krill and its physical and chemical environment. Outlines of the projects and the main results, along with a list of related publications, are presented.

B-49142

Schnack-Schiel, S.B., **Contributions of the Federal Republic of Germany to the BIOMASS Program**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.73-115, Publications p.98-113.

German scientists participated in the planning of BIOMASS from 1976 onwards. In 1978, the Federal Republic of Germany became a member of SCAR and its BIOMASS Program. It fully participated in FIBEX and both phases of SIBEX. In addition to the main BIOMASS cruises, Germany undertook 5 more cruises between 1982 and 1989 in the BIOMASS region, i.e., the greater Antarctic Peninsula area. The objectives were BIOMASS-related and focused on krill and fish biology, hydroacoustics and oceanography. Phytoplankton, zooplankton and birds were also studied. More than 200 publications have resulted from German BIOMASS-related activities. German scientists were members in most of the BIOMASS Working Groups. (Auth. mod.)

B-49143

Di Prisco, G., **Antarctic marine ecosystem: Italian contributions to the BIOMASS Programme**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.116-128, Refs. p.125-128.

The Italian National Programme for Antarctic Research (PNRA) was launched in 1985. Italy was admitted as a Consultative Member of the Antarctic Treaty in 1987, and became part of SCAR in 1988. A permanent summer station has been in operation since 1987 in

Terra Nova Bay. The station has laboratories equipped for marine biology research, and aquarium facilities. An overview of the Italian scientific activity in marine biology is presented. In illustrating the contribution to the study of the antarctic marine ecosystem, emphasis is placed on research on marine vertebrates and invertebrates, including biochemistry and molecular biology, physiology and genetics. Other activities are also included, e.g., the recent organization of international conferences, in which scientists from the BIOMASS community had the opportunity to share their research experience with Italian colleagues. (Auth.)

B-49144

Hoshiai, T., Murano, M., Nasu, K., Terazaki, M., **Japanese activities for BIOMASS**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.129-161, Publications p.151-161.

During the pre-BIOMASS activities, Japanese vessels *Umitaka Maru III*, *Kaiyo Maru* and *Hakuho Maru* conducted cruises to participate in FIBEX and SIBEX; two additional cruises were undertaken by the *Kaiyo Maru* as an extension of BIOMASS. The Japanese Antarctic Research Expedition contributed to BIOMASS with observations onboard the *Fuji* and *Shirase* and shore-based research at Showa Station. The *Umitaka Maru III* and the *Hakuho Maru* investigated primary production, abundance and distribution of phytoplankton, zooplankton and micronekton and organic particles in various oceanographic conditions south of Australia. (Auth. mod.)

B-49145

Rakusa-Suszczewski, S., **Poland's antarctic activities within the BIOMASS Programme**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.162-177, 4 refs. Publications p.167-177.

Major results of the Polish contribution to the BIOMASS Program during FIBEX (1981) and SIBEX (1983-1984), in the Bransfield Strait and Drake Passage, are discussed. Polish contributions to BIOMASS literature are listed.

B-49146

Miller, D.G.M., **Impact of BIOMASS-related research on South African antarctic science**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.178-232, 10 refs. Publications p.194-232. For another source see B-48900.

The impact of the international BIOMASS Program on South African science in the Antarctic is assessed. An analysis was undertaken of refereed papers, reports of theses containing BIOMASS-related findings and published in national or foreign literature. During the Program's fifteen-year existence (1975 to the present), a total of 163 South African scientists and their associates accounted for some 401 publications comprising in excess of 7500 printed pages. This information was analyzed further to assess the productivity of individual South African scientists involved with BIOMASS. Criteria used by the South African National Antarctic Research Programme (SANARP) to assess new research were applied to further evaluate BIOMASS' effect on the national antarctic scientific effort. Results indicate that BIOMASS has significantly influenced the direction, extent and impact of recent South African research in the Antarctic, particularly in marine life sciences. (Auth.)

B-49147

Heywood, R.B., **United Kingdom national report, Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.233-253, Publications p.240-253.**

The United Kingdom has had a well-established antarctic marine research program since the mid-1970s, centered on the nearshore waters close to the Signy and Grytviken Stations. Recently research has expanded to include the benthos of the South Orkney Is. and South Georgian continental shelf and slope regions by deploying the RRS *John Biscoe*. However, concern over the potential effects of the nascent antarctic krill and finfish fisheries in the South Atlantic sector of the southern ocean had already redirected the interests of the BAS marine biologists towards the pelagic ecosystem, and plans were well advanced to divert the research effort. Consequently, BAS scientists were able to make a significant contribution to the SCAR/SCOR meeting on the living resources of the southern ocean, held at Woods Hole, USA in 1976, and the various subsequent BIOMASS planning and working group meetings. The UK national (BAS) and BIOMASS research programs developed in parallel, and both benefited from the synergism. (Auth.)

B-49148

Makarov, R., **BIOMASS and Soviet investigations in the Antarctic (mainly on antarctic krill, *Euphausia superba* Dana), Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series, Dec. 1992 No.69, Reports of the National Contributions to the BIOMASS Program. Edited by S.Z. El-Sayed, p.254-292, Refs. p.276-292.**

For the last 15 years, the BIOMASS program has united the forces of marine biologists of different countries in the investigation of the antarctic pelagic ecosystem, with special emphasis on krill. Contributions to these investigations have been made by Soviet marine biologists during their participation in the FIBEX experiment. Basic ideas and methods of investigation, established collectively and separately, were used as a basis for further Soviet investigations of krill as well as other components of the antarctic pelagic ecosystems. A short review of the main research directions (including the joint activity during FIBEX) is described. Regions of the Scotia Sea and Lazarev Sea, areas of the Antarctic Peninsula and regions of the Commonwealth Sea and adjacent waters were observed. Observations which cover inshore waters are considered to be of special interest.

B-49149

Alder, V.A., Boltovskoy, D., **Ecology of larger microzooplankton in the Weddell-Scotia Confluence area: horizontal and vertical distribution patterns, Journal of marine research, May 1993 51(2), p.323-344, 79 refs.**

The distribution of microzooplankton >15 microns was studied in samples retrieved from 10 to 400 m in two overlapping transects along 49W, between 57S and 61 deg 30'S (Nov. 27-Dec. 12, 1988, and Dec. 27, 1988-Jan. 4, 1989). Dinoflagellates and tintinnids concentrated at 50-90 m, copepod nauplii had a more variable vertical pattern with maximum numbers at 100-200 m, and foraminifers and radiolarians were most abundant in noticeably deeper waters, peaking below 150 m. Large dinoflagellates accounted for 55% of the biomass of the heterotrophs considered in the 10-400 m layer, followed by the tintinnids (23%), copepod nauplii (11%), foraminifers (5%), and radiolarians (5%). The 100-400 m layer hosted up to 87% of total 10-400 m integrated microzooplanktonic biomass. The distribution of loricate ciliates was strongly correlated with those of chlorophyll *a*, and especially dinoflagellates, suggesting close trophic relationships between these two groups. The northern sites were generally richer in microzooplankton than the area closer to the ice-edge, and the

southernmost ice-covered zone yielded the lowest microplanktonic values. This biological pattern, which was only loosely coupled with the Weddell-Scotia Confluence, with the vertical stability of the water column, and with near-surface concentrations of chlorophyll *a*, can at least partly be explained by differential grazing pressure by crustacean mesozooplankton. Comparisons with previous abundance estimates carried out earlier and later in the growth season suggest that microzooplanktonic abundances increase toward the late summer-fall, probably in response to enhanced availability of nano- and pico-sized producers, characteristic of antarctic post-bloom conditions. (Auth. mod.)

B-49151

Buma, A.G.J., Noordeloos, A.A.M., Larsen, J., **Strategies and kinetics of photoacclimation in three antarctic nanophytoflagellates, Journal of phycology, Aug. 1993 29(4), p.407-417, 48 refs.**

Division rate, cell size, cellular fluorescence, and chlorophyll *a* content were measured in 3 nanophytoflagellates during steady and transient states of semi-continuous cultures maintained at 1.0 C. Of all parameters tested, cell size was most affected by irradiance. Acclimation kinetics were modelled using a first-order equation. Rates of change in cell size following shifts in irradiance were comparable with rates of change in chemical composition reported for temperate algae. Response rates of cellular *in vivo* red and orange fluorescence were lower. In many cases, however, responses could not be described by the first-order kinetic model. Division rates remained high for approximately 3 days following a shift down in irradiance, after which new division rates were established. The nanoflagellates studied here appear to respond to small irradiance perturbations at low rates. However, they may fail to adapt to large and abrupt changes in photon flux density (PFD). When shade-adapted cells were exposed to high PFD for 1-3 days, cells were incapable of readapting division rate and pigment content to the initial irradiance condition for about 1 month following the shift-down step. The ecological role of the kinetics of photoacclimation in nanophytoflagellate growth performance in antarctic ecosystems is discussed. (Auth. mod.)

B-49152

Uva, B.M., Masini, M.A., Napoli, L., Devecchi, M., **Immunoreactive atrial natriuretic-like peptide in antarctic teleosts, Comparative biochemistry and physiology, Feb. 1993 104A(2), p.291-297, 34 refs.**

The presence of an atrial natriuretic-like peptide (ANP) has been investigated in the antarctic fish *Chionodraco hamatus* (Channichthyidae) and *Pagothenia bernacchii* (Notothenidae). By radioimmunoassay an ANP-like peptide was detected in plasma and heart homogenates of both white blooded (*Chionodraco*) and red blooded (*Pagothenia*) species. By immunohistochemistry, atrial natriuretic factor (ANF) immunoreactive cardiocytes were detected in the atria of *Chionodraco* and *Pagothenia* using Ab to rat 99-126 ANF. Ventricular immunoreactivity is absent in both species. ANP binding sites were visualized by autoradiography in the kidney, gills and heart of both *Pagothenia* and *Chionodraco*. The data indicate that ANP concentration is greater in the white-blooded than in the red-blooded fish. (Auth. mod.)

B-49153

Gomes, V., Ngan, P.V., De Broyer, C., Rocha Passos, M.J. de A.C., **Chromosomes of the antarctic amphipod *Waldeckia obesa* Chevreux, Hydrobiologia, June 28, 1993 262(2), p.109-113, 14 refs.**

Mitotic and meiotic chromosomes of the antarctic lysianassoid amphipod *Waldeckia obesa* are described. The modal chromosome number is $n=25$ and $2n=50$. The potential applications of cytogenetical studies in this group are discussed. (Auth.)

B-49159

Beintema, A.J., **Penguin chicks in their cold environment**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.26-35, 4 refs.

This paper concentrates on the development of thermoregulation in penguin chicks. Cooling rates of chicks of different ages were measured by placing a chick in an ice-filled polystyrene box, and measuring its body temperature at intervals. Chicks of Chinstrap and Macaroni penguins are not able to maintain their own body temperature until they are 10 days old. Another method used was telemetry: a small radio transmitter was implanted into the chick, and its temperature was then continuously monitored while it was in the nest and being cared for by its parents. During development, the responsibility for keeping the chick warm is gradually transferred from the parent to the chick itself. Rapid cooling off in small chicks is not just a matter of incapability to produce enough heat, but also a strategic choice to conserve energy. Chinstrap penguins were found to shed their stomach linings when they return to the sea after feeding their chicks. The function of this hitherto undetected phenomenon is not known. (Auth. mod.)

B-49160

Lindeboom, H.J., Sandee, A.J.J., **Uric acid production and degradation in an Adélie penguin rookery at Admiralty Bay, King George I.**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.36-49, 10 refs.

A study in an Adélie penguin rookery at Admiralty Bay shows that Adélie penguins produce approximately 0.7 g uric acid nitrogen per day, leading to a total daily production in the rookery at Point Thomas of 6.1 kg. Depending on where the uric acid-containing excreta (the white liquid phase) is deposited, degradation takes place at different rates. These rates were estimated in seawater, snow, freshwater in the rookery and in rookery deposits. Under certain circumstances, e.g. low temperatures, intermediate products seem to accumulate; otherwise all uric acid nitrogen is degraded to ammonia nitrogen. A corresponding difference in bacterial flora between different samples is described. A model of the uric acid degradation pathway in the Adélie penguin rookery is given. Compared to the nitrogen pathway found in the rookeries of Macaroni and King penguins at Marion I., the evaporation of volatile ammonia from the Adélie penguin rookery seems to be much lower than the evaporation from other rookeries. The possible causes of this phenomenon, the absence of feathers from the moult and the low water content of the rookery deposit in the Adélie penguin rookery are discussed. (Auth. mod.)

B-49163

Hacquebord, L., **Hector Station on Deception Island (South Shetland Islands, Antarctica), an environmental assessment study of a whaling-station**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.72-97, 22 refs.

In the summer of 1990-1991, a multidisciplinary team of 3 scientists studied the environmental impact of a whaling station operating in Whalers Bay, Deception I., from 1911 to 1931. It was found that the station had a considerable impact on the surrounding vegetation and animals, not only during its operation but also after its abandonment. A historical review of antarctic whaling is presented.

B-49166

Huiskes, A.H.L., Gremmen, N.J.M., Francke, J.W., **Ecology of macrolichens in antarctic coastal areas**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.119-123, 1 ref.

Field work carried out on marine influence on the physiology of macrolichens from Argentine Is. resulted in the following conclusions: *Mastodia tessellata* shows a preference for places influenced by the sea or the presence of birds. Salt depresses the photosynthetic rate, but also depresses the rate of moisture loss in *M. tessellata*, allowing the species to be photosynthetically active over a longer period. In its optimal habitat, where few other lichen species occur, the photosynthetic rate of *Mastodia* is suboptimal, but the period in which the species can be photosynthetically active is prolonged, as the rate of moisture loss is lower.

B-49167

De Korte, J., **Brown Skua, *Catharacta skua lonnbergi*, on Deception Island, a comparison with skuas in the Arctic**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.126-133, 5 refs.

Data on allometric growth and fledging of the Long-tailed Skua of Greenland, which fledges after about 25 days, and the Brown Skua of South Georgia and Deception I., which fledges after about 53 days, are compared. Also compared are the timing of egg-laying and incubation behavior. The pattern of sharing incubation duties between the male and female of the two species was found to be similar.

B-49168

Van Franeker, J.A., Williams, R., **Diet of fulmarine petrels in the Windmill Islands, Wilkes Land, Antarctica. Preliminary results**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.134-138, 2 refs.

The diet of Southern Fulmars *Fulmarus glacialis*, Antarctic Petrels *Thalassoica antarctica*, Cape Petrels *Daption capense* and Snow Petrels *Pagodroma nivea*, was investigated on Ardery I. Dietary studies were started in 1986-87 and repeated in 1990-91 as a part of a long term project on these species. Results for 1986-87 showed that the main component of the food-samples of all four species of petrels was fish: on average, almost 80% by weight. Nearly all the fish eaten proved to be the Antarctic Silverfish *Pleurogramma antarcticum* of 10 to 20 cm length. Only incidentally were other fish species represented, most frequently in the Antarctic Petrel. Less than 20% of the food analyzed consisted of krill.

B-49169

Phillips, C., **Management of science in the newly protected Antarctica—the environmental angle**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.139-146.

The position of a number of non-governmental organizations toward the 1991 Environmental Protocol, and their involvement in the environmental issues during the years preceding and following it, are discussed.

B-49174

Frey, D.G., **Species of *Pleuroxus* (Anomopoda, Chydoridae) from the subantarctic islands and southernmost South America: a partial unravelling of the *Pleuroxus aduncus* problem**, *Hydrobiologia*, June 1993 262(3), p.145-188, 40 refs.

Whereas previously all populations of *Pleuroxus* known from the subantarctic islands and southernmost South America were considered to belong to a subspecies of *P. aduncus*, now there are five distinct species, only one of which resembles *P. aduncus* to any significant extent. Thus, the taxa are all distinctly different, and none of them could possibly be considered an infraspecies of *P. aduncus* sens. str. The patterns of distribution cannot be explained by an on-going passive dispersal of resting eggs. No populations of species on the subantarctic islands are known from any of the southern land masses. Conditions on these islands intuitively must have been more severe during the glacial ages than during the present interglacial, suggesting that any anomopods present were eliminated during the severe glacial periods. Yet, the presence of isolated populations of endemic species on some islands, and the complete lack of *Pleuroxus* on others, e.g. those in the Scotia Arc, argues that conditions, although more severe, still provided opportunities for the maintenance of active populations. Moreover, the morphological differences between populations of *P. wittsteini* on islands from a few hundred to several thousand kilometers apart likewise argue for genetic isolation over a very long period of time. (Auth. mod.)

B-49175

Ahn, I.Y., **Enhanced particle flux through the biodeposition by the antarctic suspension-feeding bivalve *Laternula elliptica* in Marian Cove, King George Island**, *Journal of experimental marine biology and ecology*, Sep. 6, 1993 171(1), p.75-90, 42 refs.

The infaunal lamellibranch *Laternula elliptica* (Laternulidae), one of the most common antarctic bivalves, is widely distributed in shallow waters around the antarctic continent. In order to evaluate the contribution of this species to organic carbon flux in an antarctic coastal ecosystem, biodeposition rates by *L. elliptica* were measured and compared with sedimentation without this bivalve species in laboratory experiments during one austral summer. The amount of deposited material increased in the presence of *L. elliptica*. Weight-specific biodeposition rates varied from 0.26 to 2.17 mg dry wt/g wet wt/d and the rate decreased with increased body weight. Due to massive inflows of terrigenous sediment through coastal meltwater stream into the coastal water, fecal and pseudofecal material contained a considerable amount of mineral particles and only a small percentage of organic carbon. Estimated particulate organic carbon flux through the biodeposition of *L. elliptica* is about 95 mg C/sq m/d, an amount comparable to that of a typical suspension-feeding bivalve, *Mytilus edulis*. *L. elliptica* is apparently an important agent for sedimentation of both lithogenic particles and organic particles. (Auth. mod.)

B-49176

Clarke, A., **Egg size and egg composition in polar shrimps (Caridea: Decapoda)**, *Journal of experimental and marine biology*, June 1993 168(2), p.189-203, 40 refs.

Egg volume and several aspects of egg nutrient content (dry mass, organic content, carbon and nitrogen content) were measured in eggs from five species of polar caridean shrimp (Crustacean; Decapoda): *Chorismus antarcticus*, *Notocrangon antarcticus* and *Nematocarcinus lanceopes* from the Weddell Sea, and *Lebbeus polaris* and *Eualus gaimardii* from Svalbard. In *Chorismus* and *Notocrangon* there were significant differences in mean egg volume between individual females. The degree of variation in egg size within individual females varied (within-brood CV ranged from 8 to 20%), although the average variability was similar to the between-female variation (between-brood CV for mean egg volume 14%). In all species examined, measures of egg nutrient content were significantly correlated with egg volume, indicating that differences in egg size reflect real differences in investment per embryo. However, the relationship between egg dry mass and egg volume within species differed from that between species. The common slope for within-species analysis was 97 mi-

crogram/microliter (SE 24), whereas the slope for mean data from nine caridean species was 460 microgram/microliter (SE 22). (Auth.)

B-49178

Brierley, A.S., Rodhouse, P.G., Thorpe, J.P., Clarke, M.R., **Genetic evidence of population heterogeneity and cryptic speciation in the ommastrephid squid *Martialia hyadesi* from the Patagonian Shelf and Antarctic Polar Frontal Zone**, *Marine biology*, 1993 116(4), p.593-602, 89 refs.

In comparison with the other three samples of *M. hyadesi*, one of the samples from the Patagonian Shelf (PAT 8911) exhibited fixed allelic differences at 16 of the 39 enzyme loci which were resolved (genetic identity, $I=0.51$). This high level of genetic differentiation contradicts the apparent morphological similarity between samples, indicating the presence of a cryptic or sibling congeneric species. Deviations from Hardy-Weinberg equilibrium and significant differences in allele distribution were also detected within and among the other three putative *M. hyadesi* samples, suggesting that the species fails to maintain effective panmixia across its geographical range. The occurrence of both temporal and geographic structuring within the species complex is consequently indicated, caused possibly by an overlap of reproductively isolated stocks (stock mixing) outside their respective breeding areas. Low levels of genetic variability were detected throughout the samples examined, estimates of average heterozygosity per locus within the two species detected being on the order of 0.01 and 0.002. These values are discussed in relation to levels of genetic variability reported for other squid species, and in comparison with values typically expected for marine invertebrates. (Auth. mod.)

B-49179

Castellini, M.A., Davis, R.W., Kooyman, G.L., **Annual cycles of diving behavior and ecology of the Weddell seal**, *Bulletin of the Scripps Institution of Oceanography*, Vol. 28, Berkeley, CA, University of California Press, 1992, 54p., 72 refs.

Fish are the most common prey items of the Weddell seal, and *Pleuragramma antarcticum* accounts for nearly all fish consumed. There was no seasonal or geographical alteration in the consumption of fish by the seals. Less than one third of the Weddell seal dives were deeper than 400 m, less than one tenth were deeper than 500 m and only one exceeded 600 m. Average diving depths were shallower at White I. than at McMurdo Sound. There were no seasonal differences in average dive depth at either White I. or McMurdo. There was an annual difference in average diving depth between Jan. 1979 and Jan. 1981 at McMurdo. The frequency distribution of diving depths was different among all sites and seasons. In all areas, the Dec. and Jan. diving depth distributions showed a tendency to shallower diving than at other times. Only 16 dives exceeded 50 min duration and 13 of these were from seals diving from the experimental sea ice hut laboratory. The longest dive recorded was from the hut at slightly over 82 min. Average diving durations for all seasons and sites were similar. Diving duration distributions differed geographically and seasonally with the exception of Jan. 1979 and 1981 at McMurdo, which were similar. Hourly patterns of diving frequency were not uniform except during the winter at White I. During the winter darkness, most dives occurred during the "daylight" hours whereas during the summer, most dives occurred during the "night."

B-49181

Busching, W.D., **First results of studies on feathers of antarctic birds of the South Shetland Islands and South Georgia** [Erste Ergebnisse von Studien an den Federn antarktischer Vögel von den Südshetlands und Südgeorgien], *Beiträge zur vogelkunde*, Apr. 1993 39(2), p.92-130, In German. 10 refs.

Feather characteristics of 27 bird species including Sphenisciformes, Procellariiformes, Pelecaniformes, Ciconiiformes, Anseriformes, and Charadriiformes of King George I. and South Georgia in the South Atlantic Ocean are described. The identification keys and illustrations provided should help in the identification of birds according to molted and plucked features, and aid in the study of eating behavior, molting, and systematics. Due to the scarcity of some of the collected material, Pachyptila and penguin species could not be accurately assigned at this time. (Auth.)

B-49186

Smith, V.R., **Effect of nutrients on CO₂ assimilation by mosses on a sub-antarctic island**, *New phytologist*, Apr. 1993 123(4), p.693-697, 22 refs.

N and P, especially when added together, significantly enhanced CO₂ assimilation rate in four moss species from a range of habitats on Marion I. NO₃ neg always caused a greater increase in assimilation rate than did NH₄ pos, but this might have been due to Cl neg added with the NH₄ pos. Possibly for the same reason K pos addition (as KCl) in some cases depressed CO₂ assimilation rate compared with the controls (tapwater addition), as did K + N or K + P compared with N or P alone. The degree to which the mosses were apparently sensitive to Cl neg was related to their tissue water content and to the soil water content in the habitats in which they occur. The results are discussed in the context of extremely low levels of available soil nutrients in, and small precipitation inputs of nutrients to, plant communities predominated by bryophytes on the island. (Auth.)

B-49187

Ling, H.U., Seppelt, R.D., **Snow algae of the Windmill Islands, continental Antarctica. 2. *Chloromonas rubroleosa* sp.nov. (Volvocales, Chlorophyta), an alga of red snow**, *European journal of phycology*, June 1993 28(2), p.77-84, 26 refs. For Part 1 of this study, see 18B-42088.

A new cryophilic species of the Chlamydomonadaceae is described from continental Antarctica. The species is characterized by a bimamillate papilla, four contractile vacuoles, numerous small discoid chloroplasts and an abundance of red-pigmented oil droplets. The local distribution of the species and its habitat conditions are described. The cells are susceptible to temperatures above 10 C and, unexpectedly, to subfreezing temperatures. The species has been isolated into pure culture and is currently maintained at the Australian Antarctic Division. (Auth.)

B-49193

Gamô, S., **On some serolid isopod crustaceans (Flabellifera) collected by the Japanese Antarctic Research Expedition from the antarctic sea, Yokohama National University. Science reports. Sec. II**, Oct. 1991 No.38, p.1-21, In Japanese with English summary. Ref. p.19-21.

Eleven specimens of serolids (Crustacea, Isopoda, Flabellifera, Serolidae) were collected by the Japanese Antarctic Research Expedition (JARE) in the Antarctic during 1973-85. Examination of the materials has resulted in the finding of four known species: *Serolis polita* Pfeffer, *S. pagenstecheri* Pfeffer, *S. (Ceratoserolis) trilobitoides* Eights, and *S. (C.) meridionalis* Vanhöffen. Some brief notes and illustrations are given for the species. (Auth.)

B-49194

Kito, K., Shishida, Y., Ohyama, Y., ***Plectus antarcticus* de Man, 1904 and *P. frigophilus* Kirjanova, 1958 (Nematoda: Plectidae), with emphasis on the male, from the Soya Coast, East Antarctica**, *Nematologica*, 1991 Vol.37, p.252-262, 19 refs.

Plectus antarcticus de Man, 1904 and *P. frigophilus* Kirjanova, 1958 are described, with emphasis on the male, collected from the Soya Coast, East Antarctica. *P. antarcticus* has been previously synonymized with *P. parietinus* Bastian, 1865 and *P. cirratus* Bastian, 1865 on the basis of female characteristics, but differs clearly from them by the male having the spicules not supported by a gubernaculum and one precloacal tubular supplement. *P. frigophilus* shows some variations in the features of the gubernaculum, precloacal supplement and caudal setae. The present study suggests that *P. antarcticus* and *P. frigophilus* may have been independently derived from different ancestral species and have become specialized in the Antarctic. (Auth.)

B-49196

Numanami, H., Okutani, T., **New species of the genus *Brookula* collected by the icebreaker *Shirase* from Breid Bay, Antarctica (Gastropoda: Cyclostrematidae)**, *Venus*, 1991 50(1), p.37-42, 5 refs.

The gastropod genus *Brookula* (s.l.) is characterized by a very small shell and pronounced axial ribs and spiral sculpture. Since an antarctic species of *Brookula* was first found in 1903 in the Bellingshausen Sea, 5 more species have been described to date from the antarctic and subantarctic regions: *B. decussata* (Pelseneer, 1903), *B. calypso* (Melvill and Standen, 1912), *B. kerguelensis* Thiele, 1925, *B. pfefferi* Powell, 1951 and *B. strebeli* Powell, 1951. Only a single species among them inhabits the coastal waters of Antarctica. During the course of investigations on benthic molluscan materials trawled by the icebreaker *Shirase* in 1984-1985, a new species of the genus was found in Breid Bay, and is described in this paper. (Auth. mod.)

B-49197

Chastel, O., Weimerskirch, H., Jouventin, P., **High annual variability in reproductive success and survival of an antarctic seabird, the snow petrel *Pagodroma nivea*. A 27-year study**, *Oecologia*, May 2, 1993 94(2), p.278-285, Refs. p.284-285.

Demographic parameters were estimated for snow petrels *Pagodroma nivea* nesting at Pointe Géologie Archipelago, Adélie Coast between 1963 and 1990; 21 years of data on adult survival and 27 years of data on breeding success are presented. The average age of first return and first breeding were 8.1 and 9.9 years respectively and there was no significant difference between the sexes. The overall breeding success averaged 51.3% and was widely variable between years (21-80%). Breeding frequency was very low, averaging 52% of seasons during a reproductive lifetime. Good quality sites, with high occupancy rate and high breeding success, were few in the study plots. Only 45 birds have been recovered in the study plots from a total of 115 banded fledglings. Annual survival between 3 and 10 years was 91.4%. Annual adult survival (93.4%), though variable, was low. Adult survival of males (94.7%) was not significantly different from that of females (93.9%). Over the study period the population of Pointe Géologie was stable. The growth rate was 0.948%, which was probably compensated by immigration (5.7% per year). Restricted numbers of good-quality sites at the place of birth could have led young birds to prospect other colonies. (Auth. mod.)

B-49211

Shimada, K., Pan, C.X., Ohyama, Y., **Variation in summer cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* from contrasting habitats on King George Island**, *Polar biology*, Dec. 1992 12(8), p.701-706, 13 refs.

The antarctic oribatid mite *Alaskozetes antarcticus* was collected from several field habitats near Great Wall Station during Jan. and Feb. 1990. The tritonymphs and adults were examined for their supercooling ability and survival at subzero temperatures in relation to inoculative freezing. The active tritonymphs and adults showed a wide range of supercooling points, probably due to their polyphagous

feeding activity and humid habitat conditions, with means ranging from -3.8 to -22.4 C. Detritivores were inferior to algivores in their supercooling ability. The former seemed to be transiently exposed to the hazard of freezing during the cool antarctic summer. The resting (premolting) tritonymphs exhibited the lowest mean supercooling point of -28.3 C. Inoculative freezing reduced the survival of *A. antarcticus*. Its effect became conspicuous at temperatures below -20 C and was serious in the deeply supercooled individuals, such as resting tritonymphs and algivorous adults. During the active season, spontaneous freezing, probably starting from the gut contents, seemed to be more often fatal than inoculative freezing for this freeze-intolerant species. (Auth.)

B-49212

Wanless, S., Harris, M.P., Morris, J.A., **Diving behaviour and diet of the blue-eyed shag at South Georgia**, *Polar biology*, Dec. 1992 12(8), p.713-719, Refs. p.718-719.

This paper describes a concurrent investigation of individual variation in diet, diving patterns and performance of blue-eyed shags *Phalacrocorax atriceps* breeding at South Georgia. Within one day, individual shags exhibited one of three foraging strategies: short diving, long diving, and mixed diving. The mean number of dives per day was significantly higher in shags that only made short dives than birds with a mixed diving strategy and birds that made only long dives. Diet was assessed using hard remains recovered from pellets regurgitated by the shags. Small nototheniid fish were by far the commonest prey, but most pellets contained additional items. Predicted aerobic dive limits suggested that during long dives, blue-eyed shags were probably sustained by anaerobic metabolism. Models of prey capture rates demonstrated that for both long and short diving, many items must be caught per dive when birds are feeding on prey at the lower end of the energy range. Predicted capture rates for the commonest recorded prey (small fish) differ markedly between the two diving strategies. (Auth. mod.)

B-49213

Focardi, S., **Induction of mixed function oxidase (MFO) system in two species of antarctic fish from Terra Nova Bay (Ross Sea)**, *Polar biology*, Dec. 1992 12(8), p.721-725, Refs. p.724-725.

The detoxicant Mixed Function Oxidase system was studied in two species of antarctic fish, *C. hamatus* and *P. bernacchii*, collected during the summer of 1989-1990 in Terra Nova Bay. Several specimens were induced by injection of phenobarbital (PB), 3-methylcholanthrene (3-MC) and PCBs in the caudal vein. The results show significant differences between the two species. In *C. hamatus*, basal activity of benzo(a)pyrene monooxygenase (BPMO) was among the lowest measured even in fish of temperate seas, and in *P. bernacchii* it was 20 times lower. The values of regenerating activities (NADPH-cytochrome c reductase (NADPH-CYTCRED), NADH-cytochrome c reductase (NADH-CYTCRED) and NADH-ferricyanide reductase (NADH-FERRIRED) suggest that the two species use different electron donor molecules. Injection of chemicals in the caudal vein did not provoke induction of MFO activity in *P. bernacchii*. In *C. hamatus*, phenobarbital and PB-type inducers did not cause induction, but there was a statistically significant response to 3-MC. (Auth.)

B-49214

Vacchi, M., Romanelli, M., La Mesa, M., **Age structure of *Chionodraco hamatus* (Teleostei, Channichthyidae) samples caught in Terra Nova Bay, East Antarctica**, *Polar biology*, Dec. 1992 12(8), p.735-738, 11 refs.

The age composition of *Chionodraco hamatus* samples caught by fixed nets in Terra Nova Bay during the summer 1987-88 was determined by examination of thin otolith sections. Individual ages were estimated by counting the number of annuli seen in the sections. Fish were estimated to be 5-10 years old. Although the apparent ages were not confirmed by other independent estimates, the data seem to com-

pare well with the values reported for other antarctic fishes. Females in samples studied were on average larger than males of the same age, and grew somewhat faster. (Auth. mod.)

B-49218

Campbell, I.B., Balks, M.R., Claridge, G.G.C., **Simple visual technique for estimating the impact of fieldwork on the terrestrial environment in ice-free areas of Antarctica**, *Polar record*, Oct. 1993 29(171), p.321-328, 6 refs.

A set of simple criteria for visual assessment of the effects of low-intensity fieldwork in ice-free areas of Antarctica was developed. These criteria were tested by using them to examine the impact of soil science in investigations, both immediately and some time after disturbance, at Marble Point and at Cape Evans on the shores of McMurdo Sound. The use of these criteria showed that for some types of impacts there had been a marked recovery of the surface with time, ranging from 22 months to 30 years. This was apparently due to repeated freeze and thaw of the soil surface and, to a lesser extent, to the influence of wind, which had partly or completely obliterated some of the earlier disturbances. More durable features remained, while deeper surface impressions, such as old soil inspection pits and vehicle tracks, showed little recovery after more than 30 years. Some biological colonization of areas disturbed 30 years previously is occurring. (Auth.)

B-49226

Freire, A.S., Coelho, M.J.C., Bonecker, S.L.C., **Short term spatial-temporal distribution patterns of zooplankton in Admiralty Bay (Antarctica)**, *Polar biology*, Sep. 1993 13(7), p.433-439, 16 refs.

The present work analyzes the abundance and species composition of mesozooplankton in relation to different patterns of wind speed and tides in Admiralty Bay. The plankton was sampled on Mar. 12, 13 and 15, 1989. In Martel Inlet, the zooplankton standing stock reached 15,223 individuals/100 cu m during high tide. Under north-west winds, the abundance of the dominant species *Ctenocalanus citer* and *Fritillaria borealis* followed the tidal cycle. Weak southwest winds promoted the input of plankton even during low tide. Throughout the Bay, the highest densities of plankton (446-2,899 individuals/100 cu m) were observed in surface waters flowing towards the Bransfield Strait. Surface waters flowing through the Bay and the inlets showed different species composition than surface waters flowing towards the Bransfield Strait. (Auth.)

B-49227

Delille, D., **Seasonal changes in the abundance and composition of marine heterotrophic bacterial communities in an antarctic coastal area**, *Polar biology*, Sep. 1993 13(7), p.463-470, Refs. p.469-470.

Three field stations were sampled weekly in 1989 in the Adélie Coast area to obtain physicochemical (temperature and particulate organic matter) and bacteriological (total and heterotrophic counts, estimation of bacterial production) measurements. The bacterial community structure was investigated by carrying out 27 morphological and biochemical tests on 254 strains isolated during each season. Gram-negative non-fermentative rods were always dominant. However, an obvious difference exists between the communities inhabiting ice-free and ice-covered seawater. The potential metabolic abilities which were relatively significant in the summer community were severely reduced in the winter community. A general increase in bacterial biomass and production was observed in surface water after sea-ice formation. The results suggest a close coupling between heterotrophic bacterioplankton and the input of allochthonous organic carbon from the overlying sea-ice communities or from nearby penguin rookeries. (Auth. mod.)

B-49228

Laubscher, R.K., Perissinotto, R., McQuaid, C.D., **Phytoplankton production and biomass at frontal zones in the Atlantic sector of the southern ocean**, *Polar biology*, Sep. 1993 13(7), p.471-481, Refs. p.480-481.

A high resolution study of chlorophyll *a* and primary production distribution was carried out in the Atlantic sector of the southern ocean during the summer of 1990-91. Primary production and photosynthetic capacity levels at frontal systems were among the highest recorded during the cruise. Blooms at ocean fronts were strongly dominated by specific size classes and species. This suggests that the increase in biomass was probably the result of an enhancement of *in situ* production by selected components of the phytoplankton assemblage, rather than accumulation of cells through hydrographic forces. This hypothesis is supported by the high variability of photosynthetic capacities at adjacent stations along the transects. Blooms were found at three oceanic fronts during the early summer. Seasonal effects on phytoplankton community structure were very marked. In early summer (Dec.), netphytoplankton was consistently the major component of the frontal blooms, with the chain-forming diatoms *Chaetoceros* spp. and *Nitzschia* spp. dominating at the Subantarctic and Antarctic Polar Fronts, respectively. During the late summer (Feb.), nanophytoplankton usually dominated algal communities at the main frontal areas. Only at the Antarctic Polar Front did netphytoplankton dominate, with the diatom component consisting almost exclusively of *Corethron criophilum*. (Auth. mod.)

B-49229

Freckman, D.W., Virginia, R.A., **Extraction of nematodes from Dry Valley antarctic soils**, *Polar biology*, Sep. 1993 13(7), p.483-487, 25 refs.

Nematode density and taxonomic composition from Dry Valley soil processed by the sugar centrifugation (SC) method in Antarctica was compared to those extracted from soils shipped frozen to the USA and processed by either the SC or Baermann Funnel (BF) (at 5 C and 10 C) techniques. Soil selected for the extraction comparisons represented a wide range of soil properties found in the Dry Valleys. More nematodes were recovered from freshly collected antarctic soil and from stored frozen soil using the SC technique than from BF at either temperature ($P < 0.5$). Temperature had no effect on nematode densities extracted by the BF. *Scottinema lindsayae* was the most abundant species recovered by all extraction methods, but recovery was significantly lower from stored soils. Thus, nematodes can be extracted qualitatively following frozen storage using SC, but quantitative studies of nematode populations should be based on soils extracted following field sampling. (Auth.)

B-49230

Valbonesi, A., Loporini, P., **Biology of *Euplotes focardii*, an antarctic ciliate**, *Polar biology*, Sep. 1993 13(7), p.489-493, 19 refs.

Euplotes focardii, a ciliate species recently collected from sand sediments of Terra Nova Bay, reproduced in the laboratory with a duplication time of approximately 72 h at 4 C. Strains representative of two different mating types were identified and mixed together to produce mating pairs. These showed traits rather unusual for *Euplotes* species. The two pair members remained united for at least 8-10 days. However, only one carried out fertilization and was able to give rise to a new clone of vegetative cells; the other underwent cell body shrinking after 4-5 days of union, lost the locomotory ciliary apparatus, and eventually died. By analyses of mating pairs formed in mixtures of cell samples cytologically distinct from each other, it was ascertained that the different cell behavior is strain-specific. (Auth.)

B-49231

Kock, R., **Planktonic ostracods along the Antarctic Peninsula during the 1989/90 summer season**, *Polar biology*, Sep. 1993 13(7), p.495-499, Refs. p.498-499.

The composition of the planktonic ostracod fauna in the upper 200 m along the Antarctic Peninsula for Dec./Jan. 1989-90 is described from quantitatively graded RMT 1-hauls. Abundances were low in the entire survey area, possibly due to a mass occurrence of salps. *Alacia belgicae* and *A. hettacra* were by far the most abundant ostracod species, appearing mainly in the deepest stratum (200-140 m). For both species the development stage structure is described, and indices for the "mean population stage" are calculated and compared with cited data. An ontogenetic upward migration is indicated. (Auth.)

B-49232

Spielmeyer, W., McMeekin, T.A., Miller, J., Franzmann, P.D., **Phylogeny of the antarctic bacterium, *Carnobacterium alterfunditum***, *Polar biology*, Sep. 1993 13(7), p.501-503, 16 refs.

The bacterium *Carnobacterium alterfunditum* was recently isolated from the anaerobic monimolimnion of Ace Lake and described as a new species of the genus *Carnobacterium*. The placement of this species in the genus *Carnobacterium* was based on the analysis of morphotype, cell wall chemistry, fermentation end products, mole%G+C of the DNA, fatty acid analysis, carbon source tests, and other physiological analyses. Although phylogenetic data (16S rRNA sequences) are known for all other species of the genus, none is available for *C. alterfunditum*. To confirm the placement of this organism within the genus *Carnobacterium*, and to complete the data set of 16S rRNA sequences for all species of the genus *Carnobacterium*, the authors sequenced 98% of the 16S rDNA gene of *C. alterfunditum*. Furthermore, this completed the data set of 16S rRNA sequences for all species of the genus *Carnobacterium*, which should allow identification of suitable sequences for targeting with genus-specific molecular probes. (Auth. mod.)

B-49233

Rothery, P., Block, W., **Characterizing supercooling point distributions**, *Cryo-Letters*, 1992 Vol.13, p.193-198, 14 refs.

A method for describing variation in supercooling point distributions is presented. This uses extreme-value distributions either singly for data comprising high or low groups, or in a mixture when both groups are present. The model provides a framework for characterizing between- and within-species variation in supercooling point distributions. The method is applied to field samples of four species of arthropods from Signy I. in the maritime Antarctic collected in different seasons and years. (Auth.)

B-49251

Adamson, D.A., Selkirk, J.M., Seppelt, R.D., **Serpentinite, harzburgite, and vegetation on subantarctic Macquarie Island**, *Arctic and alpine research*, Aug. 1993 25(3), p.216-219, 17 refs.

This paper examines the ecological relationship between vegetation patterns and geological surfaces on Macquarie I. The northern third of the island's plateau contains large areas of serpentinite and harzburgite. Outcrops of basalt rich in phenocrysts of olivine and pyroxene occur farther south. Where large enough to influence soil formation, all these areas are marked by sparse vegetation cover with small, apparently slow-growing plants and a high percentage of bare ground, in sharp contrast to adjacent areas. Soils and plants on serpentinite and harzburgite areas contain high nickel and magnesium but have lowered calcium/magnesium ratios. There are no species confined to the serpentinite and harzburgite rocks and none is a hyperaccumulator of nickel, presumably because of the short time with

respect to evolution that the island has been above sea level. (Auth. mod.)

B-49260

Croxall, J.P., Rothery, P., Crisp, A., **Effect of maternal age and experience on egg-size and hatching success in Wandering Albatrosses *Diomedea exulans*, *Ibis*, July 1992 134(3), p.219-228, 30 refs.**

The roles of maternal age and experience on the one hand, and individual, year and random effects on the other, in influencing avian egg-size hatching success have been investigated with Wandering Albatrosses *Diomedea exulans* of known age (7-30 years) and experience (1-18 breeding attempts) over a 10-year period. Older and more experienced birds laid larger eggs. After allowing for year and controlling for experience, significant age effects remained; after controlling for age, no detectable experience effects remained. However, age accounted for only 6% of the overall egg size variation. Egg size varied significantly between years, and has increased over the last decade. Individuals laid eggs of consistent sizes; 55% of the random variation in egg weight was due to such effects. Egg and hatching weight were very closely linked; larger eggs also had higher hatching success. The latter was influenced significantly by age and experience, but neither remained significant after controlling for the other. Year effects were also detectable. (Auth. mod.)

B-49262

Green, K., Burton, H.R., **Comparison of the stomach contents of southern elephant seals, *Mirounga Leonina*, at Macquarie and Heard Islands, *Marine mammal science*, Jan. 1993 9(1), p.10-22, 32 refs.**

There are three major breeding populations of southern elephant seals centered on Macquarie I., Kerguelen-Heard Is. and South Georgia-Antarctic Peninsula. The composition of the diet differs among these populations, based on published data from Signy I. and data presented here from Macquarie and Heard Is. These differences in diet appear to be linked to the location at which seals were sampled, ranging from the least antarctic (Macquarie I.) to the most antarctic (Signy I.). The major food remains consisted of cephalopod beaks and fish eye lenses. More benthic material was found at Heard than at Macquarie Is. The diet at Macquarie differed between summer and winter and between young animals and adults. The difficulty in collecting dietary samples of southern elephant seals near their main foraging areas makes the study of the feeding ecology of this species extremely hard in comparison with other southern ocean species. (Auth.)

B-49266

Hewitt, R.P., Demer, D.A., **Dispersion and abundance of antarctic krill in the vicinity of Elephant Island in the 1992 austral summer, *Marine ecology progress series*, Sep. 1993 99(1-2), p.29-39, 60 refs.**

Antarctic krill distribution and abundance were estimated from 4 acoustic surveys conducted in the vicinity of Elephant I. from mid-Jan. to mid-Mar. 1992. The first and last surveys covered a 105 by 105 n mile study area centered on Elephant I.; the second and third surveys covered a 60 by 35 n mile area immediately north of Elephant I. During the first survey, krill were distributed in a wide band extending along the north side of Elephant I. and wrapping around the western end; biomass was estimated to be 2.2 million metric tons (t). During the second survey, the highest densities of krill were over the shelf extending to the northwest from Elephant I. and including the Seal I. archipelago; high densities of krill also extended off the shelf from the northeast end of Elephant I. into deeper water. Biomass in the smaller survey area was estimated to be 0.7 million t. Three weeks later, high krill densities were still apparent in the vicinity of Seal I., but the area of high density previously mapped off the northeast end of Elephant I. had diminished considerably; biomass

was estimated to be 0.4 million t. During the final survey, conducted 6 wk after the first survey, krill were mapped in reduced densities primarily to the west of Elephant I.; biomass over the larger survey area had declined to 1.1 million t. (Auth.)

B-49268

Greenfield, L.G., Smellie, J.M., **Known, new and probable snow petrel breeding locations in the Ross Dependency and Marie Byrd Land, *Notornis*, June 1992 39(2), p.119-124, 22 refs.**

This literature review of breeding sites of snow petrels covers the period 1937-1991. Nests have been identified all around the antarctic continent but predominantly in the Ross Dependency and Marie Byrd Land. Since much of the literature mentions that snow petrels nest on vertical cliffs inaccessible for accurate counts, criteria have been established for positive identification of nests: (a) birds sitting on ledges and disappearing inside cracks on steep cliff faces and birds flying off these ledges; (b) streaks of guano below these ledges; (c) presence of nearby nesting skuas with regurgitated snow petrel bones and feathers as evidence of feeding, and (d) the presence of large flocks of birds constantly wheeling around the same rock outcrop. Some of the cited observations require confirmation because the nests are not described by these criteria.

B-49269

Clark, G.S., Cowan, A., Harrison, P., Bourne, W.R.P., **Notes on the seabirds of the Cape Horn Islands, *Notornis*, June 1992 39(2), p.133-144, 43 refs.**

Observations of seabirds during two visits in the yacht *Totorore* to the southern extremity of South America in the summer and autumn of 1984 and 1985 are summarized with comments on their status in South America. Rockhopper and Macaroni penguins are commoner than in the past, but larger penguins were not found breeding and may be more vulnerable since penguins still appear to be taken for bait. Chile hold about a sixth of the world's breeding Black-browed Mollymawks, a tenth of the Grey-headed Mollymawks, many Blue Petrels and Narrow-billed Prions, and some Southern Giant Petrels. The White-chinned Petrel probably breeds, and possibly the Fairy Prion, collected in the past, and Antarctic Cormorant. The first Manx Shearwaters for Chile were also seen in the Magellan Strait and near Cape Horn. (Auth. mod.)

B-49271

England, M.H., Godfrey, J.S., Hirst, A.C., Tomczak, M., **Mechanism for Antarctic Intermediate Water renewal in a world ocean model, *Journal of physical oceanography*, July 1993 23(7), p.1553-1560, 27 refs.**

Realistic representation of the low-salinity tongue of Antarctic Intermediate Water (AAIW) has been achieved in a coarse-resolution ocean general circulation model. The authors find that this water mass is not generated by direct subduction of surface water near the polar front. Instead, the renewal process is concentrated in the southeast Pacific Ocean off southern Chile. The outflow of the East Australian Current progressively cools (by heat loss to the atmosphere) and freshens (by assimilation of polar water, carried north by the surface Ekman drift) during its slow movement across the South Pacific toward the AAIW formation zone. Further deep warm advection near Chile enables more convective overturn, resulting in very deep mixed layers from which AAIW is fed into the South Pacific and also into the Malvinas Current. Along with this isolated region of AAIW renewal, the model relies on alongisopycnal mixing of fresh surface water from the polar front to capture a realistic circumpolar tongue of low salinity water at 1000 m depth. (Auth.)

B-49293

Johnston, C.G., **Microbial biogeochemistry in antarctic cryptoendolithic communities**, University of Cincinnati, 1992, 78p., University Microfilms order No.93-02398, Ph.D. thesis. Refs. p.64-68.

Lipid carbon turnover times were determined to be in the order of 20,000 years in antarctic cryptoendolithic communities, and are among the longest turnover times found on Earth. Community biomass was not particularly low for microbial community. Rare temperature excursions above freezing permitted moderate rates of photosynthetic carbon incorporation. These communities were not nutrient limited, since photosynthetic metabolism was unaffected by 100nM to 1mM additions of nitrate, ammonium, phosphate, or manganese. Oxalate was the only organic acid detected in rocks colonized by cryptoendolithic lichen. Community photosynthetic metabolism was involved since oxalate production was 4 to 10 times higher in light vs. dark incubations. The effect of oxalate on mineral dissolution was examined using the thermodynamic computer model MINTEQA2 with analytical chemical data as input. The model predicted that oxalate forms water-soluble complexes with Fe(III) which leads to the dissolution of amorphous Fe oxyhydroxides. When oxalate was added to rock samples at the concentration found in lichen colonized rocks (120 ug/g), increased dissolution of Fe, Al, Si, P, and K was observed. Evidence of biological production of oxalate and demonstration that oxalate increases mineral dissolution in native rock supports the hypothesis that the exfoliative weathering pattern characteristic of certain antarctic rock formations results from colonization of cryptoendolithic lichen. (Auth. mod.)

B-49294

Kang, S.H., **Phytoplankton in the Antarctic Marginal Ice Zone**, College Station, Texas A and M University, 1992, 272p., University Microfilms order No.93-15088, Ph.D. thesis. Refs. p.167-181.

Phytoplankton cells from discrete water samples from 73 stations near the antarctic marginal ice-edge zones during all seasons were counted to gain quantitative information on the composition, abundance, distribution, and condition of the phytoplankton. The prymnesiophyte, *Phaeocystis* sp. and the diatom species *Fragilariopsis cylindrus* were the predominant phytoplankton in the ice-edge zone. *Phaeocystis* sp. attained the highest mean integrated values in the studied depths throughout the euphotic zone during summer. There were seasonal and regional differences in abundance between *Phaeocystis* sp. and total diatom species. *Phaeocystis* sp. cells were higher than total diatoms in early spring, but total diatoms were higher than *Phaeocystis* sp. in autumn. During late spring, summer, and winter there was no significant difference between *Phaeocystis* sp. and total diatoms. The overall spatial pattern of *Phaeocystis* sp. and diatom species near the marginal ice-edge zones during the five seasonal cruises was different. Diatom species were generally observed in highest numbers in the open water seaward of the ice edge, while *Phaeocystis* sp. dominated under the ice and near the ice-edge stations. A regression analysis suggests that both *Phaeocystis* sp. and diatom species are important contributors to phytoplankton increase in the marginal ice zones in different regions such as under ice, near ice, and open water and seasons. (Auth. mod.)

B-49302

Kimura, N., **Chlorophyll distribution derived from CZCS and fishing ground of *Euphausia superba* in the antarctic ocean**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.274-277, In Japanese with English summary. 4 refs.

Previous studies have established that ocean color information from NIMBUS-7 Coastal Zone Color Scanner (CZCS) could be relat-

ed to distribution of phytoplankton pigment concentrations. CZCS data from polar regions have been used only to a limited extent, because of problems related to extensive cloud cover, large solar zenith angles, bio-optical algorithm and other logistic constraints. The abundance of antarctic krill is compared with the chlorophyll distributions derived from CZCS. (Auth. mod.)

B-49303

Hoshiai, T., **Overview and perspectives of the study on ice algae and its associated ecosystem**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.327-334, 21 refs.

Ice algal communities off Hokkaido and Antarctica are compared. Off Hokkaido there is a proliferation of sea ice algae in spring but not in autumn. In the vicinity of Showa Station, however, in addition to the spring proliferation, an autumnal proliferation has also been observed at the bottom of newly formed sea ice about 30 cm thick. Standing stock values of 30 mg and 6.22-8.88 mg of chlorophyll *a*/sq m for the autumnal ice algal community at Showa Station have been reported. Sea ice algae is a carbon sink and a primary producer providing food for zooplankton and krill.

B-49310

Kurbjewit, F., **Reproduction and life cycles of dominant copepod species from the Weddell Sea, Antarctica** [Reproduktion und Lebenszyklen dominanter Copepodenarten aus dem Weddellmeer, Antarktis], *Berichte zur Polarforschung*, 1993 No.129, 238p., In German with English summary. Refs. p.212-233. This work is the published version of a Ph.D. dissertation submitted to the Faculty of Biology and Chemistry, University of Bremen in 1993.

This thesis concerns the life cycles and reproduction of the dominant copepod species in the Weddell Sea, *Calanus propinquus*, *Metridia gerlachei*, *Microcalanus pygmaeus* and *Stephos longipes*. Stage composition, *in situ* and laboratory egg production experiments and physiological parameters are discussed. From mid-Nov. until the end of Mar. 1990-91 and from mid-Dec. until mid-Jan. 1992-93, 57 vertical zooplankton hauls were made from RV *Polarstern* between 1000 m and the surface, at the bottom, and at the surface, respectively. At 28 stations along five transects, species and stage composition of the above mentioned species were examined in relation to hydrography and ice conditions. In addition, the gonad development of females, egg production under quantitatively and qualitatively different regimes, length-frequency data, dry weight, C/N ratios, lipid content and its composition as well as respiration were examined. With the aid of *in situ* reproduction experiments and physiological parameters, life cycles for *C. propinquus*, *M. gerlachei*, *M. pygmaeus* and *S. longipes* are suggested on the basis of horizontal and vertical distribution data. (Auth. mod.)

B-49319

Cormaci, M., Furnari, G., Scammacca, B., **Benthic algal flora of Terra Nova Bay (Ross Sea, Antarctica)**, *Botanica marina*, 1992 35(6), p.541-552, 35 refs.

Results are reported of a floristic study of the benthic macroalgae from Terra Nova Bay, based on collections made during two Italian expeditions to Antarctica. A brief description, phytogeographic data and, where necessary, taxonomic and nomenclatural observations are given for the 17 taxa encountered (9 Rhodophyceae, 4 Fucophyceae and 4 Chlorophyceae). (Auth.)

B-49320

Van der Spoel, S., Schalk, P.H., Bleeker, J., *Clio piatkowski*, a mesopelagic pteropod new to science (Gastropoda, Opisthobranchia), *Beaufortia*, July 17, 1992 43(1), p.1-6, 7 refs.

A pteropod species new to science is described from benthopelagic samples taken in high antarctic waters of the Weddell Sea. Comparisons with related species are made and its taxonomic place in the genus *Clio* is discussed. (Auth.)

B-49321

Smith, R.I.L., **Dry coastal ecosystems of Antarctica**, Ecosystems of the world 2A. Dry coastal ecosystems: polar regions and Europe, edited by E. Van der Maarel, Amsterdam, Elsevier, 1993, p.51-71, Refs. p.67-71.

DLC QH541.5.C65 D79 Vol.1 1993

Two coastal regions may be distinguished in the antarctic biome. The more northerly, milder and wetter maritime antarctic semi-desert region occurs on the west side of the Antarctic Peninsula to c. 70S and in its offshore islands and the island archipelagoes of the Scotia Ridge (South Shetland Is., South Orkney Is., South Sandwich Is.) and Bouvetöya. Virtually all extensive areas of ice-free terrain, excluding nunataks, are within 2 km of the sea and therefore lie within the coastal zone. Within this region about 20% of the coastal terrain is snow- and ice-free in summer, and it is here that the only two phanerogams and two dipteran insects of the antarctic biome occur. The rest of coastal Antarctica comprises the colder drier circumpolar coastal continental antarctic desert region, and includes the east coast of the Antarctic Peninsula. However, barely one-third of the coastline of continental Antarctica has a seaboard, the other two-thirds being separated from the open sea by ice shelf up to 100 m high and extending in places 500 to 800 km from the coast. Of this coastline with seaboard, less than one-tenth possess snow- and ice-free terrain in summer. Unlike the maritime antarctic, the greatest expanses of permanently ice-free land lie inland as series of cold and barren ablation valleys. Only relatively small areas of these dry valleys extend to the coast.

B-49322

Smith, R.I.L., **Dry coastal ecosystems on sub-antarctic islands**, Ecosystems of the world 2A. Dry coastal ecosystems: polar regions and Europe, edited by E. Van der Maarel, Amsterdam, Elsevier, 1993, p.73-93, 97 refs.

DLC QH541.5.C65 D79 Vol.1 1993

The sub-antarctic biome is a highly disjunct circumpolar region comprising several widely separated and very isolated island groups in the South Atlantic, South Indian and South Pacific Oceans, lying between latitudes 45 and 55 S. It includes those islands with a tundra-like vegetation from the southern limit of arborescent vegetation southward to the southern limit of extensive closed phanerogamic communities, i.e. South Georgia, Marion and Prince Edward Is., Îles Kerguelen, Macquarie I., Heard and McDonald Is. A small number of vascular plants, including pteridophytes, dominate the vegetation near sea level, while cryptogams predominate in more exposed areas of fellfield. Seabirds and seals are abundant; higher insects are common, and spiders, molluscs and earthworms exist on most islands. The position of each island group in relation to the Antarctic Convergence is largely responsible for the severity of the climate, and consequently for the proportion of land which remains permanently ice-covered. Thus the three groups lying to the north of this oceanic boundary are virtually snow- and ice-free in summer, while those lying well to the south of it have a large amount of permanent ice cover, with most of the ice-free terrain lying below about 500 m, except for nunataks and cliffs at higher elevations. Relations with the southern coastline of New Zealand, as described in Part B, are evident.

B-49342

Voisin, J.F., Voisin, C., Bock, W.J., Théry, M., *Catharacta antarctica lonnbergi* Mathews, 1912 (currently *Catharacta skua lonnbergi*; Aves, Charadriiformes): proposed conservation of the subspecific name, *Bulletin of zoological nomenclature*, Mar. 25, 1993 50(1), p.48-51, 26 refs.

The purpose of this application is to conserve the subspecific name of *Catharacta skua lonnbergi* Mathews, 1912 (family Stercorariidae). The name is in universal usage for the brown skua of the subantarctic region, but is threatened by the unused senior subjective synonym *Stercorarius antarcticus madagascariensis* Bonaparte, 1856, for which suppression is proposed. (Auth.)

B-49343

Alerstam, T., Gudmundsson, G.A., Larsson, B., **Flight tracks and speeds of antarctic and Atlantic seabirds: radar and optical measurements**, *Royal Society of London. Philosophical transactions. Series B*, Apr. 29, 1993 340(1291), p.55-67, 32 refs.

DLC QH301.R648a

A tracking radar and an optical range-finder, placed on a ship, were used to register the flight of 11 species of seabirds in waters off the Antarctic Peninsula and in the Atlantic Ocean. Average airspeeds of most species fell between the minimum power and maximum range speeds estimated from aerodynamical theory. Species using gliding or flap-gliding flight showed a mean airspeed close to the gliding speed for best glide ratio. Optimal speeds in foraging flights, as expected for the south polar skuas and Wilson's storm-petrels, are unlikely to coincide with the minimum power and maximum range speeds. Albatrosses reached the fastest resulting travel speeds when moving at angles 120-150 deg from the wind (partly following winds), with strong wind forces. They predominantly travelled with the wind from their left side which, in the Southern Hemisphere, would lead them away from low pressure centers and towards high pressure areas. (Auth. mod.)

B-49344

Jackson, S., Place, A.R., Seiderer, L.J., **Chitin digestion and assimilation by seabirds**, *Auk*, Oct. 1992 109(4), p.758-770, Refs. p.768-770.

As a structural component of crustacean exoskeletons, chitin is the most important carbohydrate in the diets of many marine carnivores. To investigate the physiological and biochemical adaptations that may enable seabirds to break down this "prey defense," the authors estimated chitin digestibilities for Sooty albatrosses (*Phoebastria fusca*), White-chinned petrels (*Procellaria aequinoctialis*), Rockhopper penguins (*Eudyptes chrysocome*), Gentoo penguins (*Pygoscelis papua*), King penguins (*Aptenodytes patagonicus*) and Leach's Storm-petrels (*Oceanodroma leucorhoa*) fed on antarctic krill. These species retain a substantial proportion of ingested chitin. The authors also obtained preliminary estimates of chitinolytic activity in the gastric mucosae of the above six species. Overall, it was found that seabirds have a capacity to assimilate a considerable portion of the carbon and nitrogen present as chitin in the exoskeleton of their prey. The potential costs and benefits of chitin hydrolysis, as well as the absorption of the breakdown products, need to be assessed. (Auth. mod.)

B-49345

Weimerskirch, H., Salamolard, M., Sarrazin, F., Jouventin, P., **Foraging strategies of Wandering Albatrosses through the breeding season: a study using satellite telemetry**, *Auk*, Apr. 1993 110(2), p.325-342, Refs. p.340-342.

Satellite telemetry of Wandering albatrosses (*Diomedea exulans*) breeding on the Crozet Is. revealed two distinct foraging strategies during successive stages of the breeding season: systematic foraging over extensive distances, and use of specific areas close to the colony.

During early incubation, Wandering albatrosses foraged over pelagic waters at an average range of 1,284 km. The length of the foraging trips decreased towards the end of the incubation period. During the first month of chick rearing when parents brood alternately for short periods, the foraging range, distance covered, and area prospected were further reduced. Males tended to return to an individual foraging area, located at the edge of the continental shelf, that had previously been visited during the long trips of the incubation period. Females mostly prospected pelagic waters just off the shelf. Wandering albatrosses use two foraging strategies to cope with the constraints imposed by the different stages of the breeding cycle, the availability of prey, and the distribution of the prey. Use of two foraging strategies may be a compromise based on the simultaneous need to satisfy the different food requirements of chicks and parents. (Auth. mod.)

B-49350

Robinson, C., Williams, P.J., **Temperature and antarctic plankton community respiration**, *Journal of plankton research*, Sep. 1993 15(9), p.1035-1051, Refs. p.1049-1051.

Antarctic plankton community respiration rates were determined from *in vitro* changes in dissolved oxygen. Oxygen consumption rates, measured at *in situ* temperatures between 0 and 6 C, were found to lie in the range 0.3-3.7 micromol O₂/l per 24 h. Water samples were collected between East Falkland Is. and South Georgia, and incubated shipboard in the dark at up to 36 temperatures between -2 and 14 C. A respiration rate at each temperature was then determined and used to calculate the temperature coefficient (Q₁₀) of antarctic planktonic community respiration from the Arrhenius equation. Fourteen Q₁₀ values lay in the range 1-3, with four further values > 5. This range of temperature coefficient values for community respiration is comparable to the published range of values for plankton photosynthesis. Frequency distributions of temperature coefficients for the two processes show similar modal Q₁₀s of 2-3. Thus, this study does not lend support to the hypothesis of a differential response of photosynthesis and community respiration to low temperature. (Auth.)

B-49351

Olech, M., Söchting, U., **Four new species of *Caloplaca* from Antarctica**, *Lichenologist*, 1993 25(3), p.261-269, 5 refs.

Four new species of *Caloplaca* are described from Antarctica: *C. buelliae* is parasitic on *Buellia*, *C. iomma* has a characteristic deep reddish orange color on the apothecia, *C. psoromatis* is parasitic on *Psoroma* and *Pannaria*, and *C. siphonospora* is a parasitic species of mosses, very similar to *C. nivalis*, but with much shorter spores. (Auth.)

B-49352

Orange, A., ***Thelidium austroatlanticum* (Verrucariaceae), a new species from the South Orkney Islands**, *Lichenologist*, 1993 25(3), p.271-277, 7 refs.

Thelidium austroatlanticum sp. nov. is described from Signy I. It is characterized by an epilithic thallus, more or less appressed involucrellum, and 1-septate spores 30-40 microns long. *T. incavatum* is also reported for Signy I. (Auth. mod.)

B-49353

Gales, R., **Breeding energetics and food requirements of gentoo penguins (*Pygoscelis papua*) at Heard and Macquarie Islands**, *Journal of zoology (London)*, Sep. 1993 231(1), p.125-139, Refs. p.138-139.

The food and energy requirements of breeding gentoo penguins (*Pygoscelis papua*) were studied at Heard and Macquarie Islands by means of isotope turnover techniques. The food consumption rates of chicks were measured at various stages of growth, providing esti-

mates of the total food provided by adults to rear a chick to fledging. The energy expenditures of attending adults were also measured at different stages of chick-rearing, allowing the total energy costs associated with breeding to be established for a pair of adults and at the population level on both islands. The total annual energy budget of a 6.2 kg breeding gentoo penguin is estimated to be 1517 MJ, which is equivalent to the consumption of 292 kg of prey. (Auth.)

B-49354

Makarov, R.R., Men'shenina, L.L., Soliankin, E.V., **Euphausiid larvae in the eastern zone of the Weddell Gyre**, *Oceanology*, Oct. 1992 32(2), p.186-190, Translated from Okeanologiya. 19 refs.

The species makeup, abundance, and age composition of euphausiid larvae were studied in the easternmost part of the Weddell Gyre (Feb. 1988) and on a transect along 10E (Feb. 1987). Larvae of all antarctic species except *E. crystallophorias* were found. The larval fauna was closely correlated with water composition. Larvae of the low-latitude species *E. frigida* were able to penetrate into cold high-latitude waters of the Weddell Sea (along the northern periphery of the Weddell Gyre) only when they were carried by waters of a secondary front between the Antarctic Circumpolar Current (ACC) and the Weddell Gyre, or were transported south by vortices detaching from the ACC. Only larvae of *T. macrura* and *E. superba* were found in the waters of the Weddell Gyre. Overall in the period studied the abundance of the euphausiid larvae was highest in the waters of the ACC and lowest in the Weddell Gyre. *E. superba* larvae had not yet entered the plankton in large numbers at the time of the investigation. The spawning of *T. macrura* begins earlier in waters of the Weddell countercurrent (with relatively warm conditions but located south of the Weddell Gyre) and especially in the ACC, and only later in the waters of the Gyre itself. (Auth.)

B-49355

Fedotov, A.S., **Winter distribution of Euphausiid larvae in the convergence zone of the Antarctic Circumpolar Current and Weddell Sea waters**, *Oceanology*, Oct. 1992 32(2), p.191-196, Translated from Okeanologiya. 17 refs.

The data of an integrated oceanographic survey in the eastern Atlantic sector of the southern ocean made during June 1982 indicate the distribution, abundance and age makeup of euphausiid larvae in various antarctic water modifications. The larvae of *E. triacantha* and *E. frigida* are found exclusively in waters of the Antarctic Circumpolar Current (ACC), and larvae of *E. superba* and *Th. macrura* occur in waters of both the ACC and the Weddell Sea. The larvae of *E. frigida* and *E. superba* were most abundant in eddy structures in the flow field of the frontal zone. The end of the reproductive period is delayed in the waters of the ACC in the case of *E. frigida* and *E. superba* and also in Weddell Sea waters in the case of *E. superba*. The spawning of *E. superba* is brief in Weddell Sea waters and is longer in those of the ACC. Oceanic spawning of *E. superba* in the eastern part of the zone where the two water modifications converge appears to be important in the reproduction and recruitment of krill stocks in the Atlantic sector of the antarctic ocean. (Auth.)

B-49362

Scientific Committee for the Conservation of Antarctic Marine Living Resources, **Selected scientific papers 1992**, Hobart, Tasmania, CCAMLR, 1992, 350p., In English with French, Russian and Spanish summaries. Refs. passim. For individual papers see B-49363 through B-49383.

This document contains a selection of the scientific papers presented at meetings of the Scientific Committee and its Working Groups in 1992. Abstracts of the papers and captions of tables and figures are translated into the official languages of the Commission (English, French, Russian and Spanish). (Auth.)

B-49363

Zuleta, A.V., Moreno, C.A., **Catch-at-age analysis applied to new fisheries: the case of *Dissostichus eleginoides***, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.3-9, In English with French, Russian and Spanish summaries. 7 refs.

Traditionally, the approach used in the assessment of new fisheries has been based on research surveys, making it possible to estimate the standing stock and potential yield of a resource by coarse methods. The main aim of such surveys is to monitor fishing operations in order to develop a comprehensive sampling design which will provide data in line with assessment procedures that are quite similar to those commonly used in statistical sampling theory. These procedures are, to a certain extent, limited by the complex fishing strategies of the operators and by the movements of fish stocks, which seriously affect model assumptions. This paper demonstrates that for a new fishery, analyses using catch-at-age data derived from research cruises may provide an alternative to other methods of estimating the parameters of fish stocks. This alternative method is applied to the new fishery of *Dissostichus eleginoides* off the south of Chile which is being conducted in accordance with CCAMLR regulations. (Auth.)

B-49364

Robotham V., H., Young U., Z., **Iterative model to construct an age/length key to assess the age composition of a new fishery for *Dissostichus eleginoides* in Chile** [Modelo iterativo de construcción de clave edad-longitud para estimar la composición de la captura por edad en la pesquería incipiente de *Dissostichus eleginoides* en Chile], Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.11-20, In Spanish with English, French, and Russian summaries. 10 refs.

Traditional estimation of age composition of catch requires that age/length data and random length frequency have been sampled from the same population. If such sampling is not possible, the estimates of the age distribution could be biased. By using an iteration algorithm, it is possible to overcome this limitation. The age composition of catch for *Dissostichus eleginoides* was obtained with the application of a single age/length key to the monthly length distribution using a nonlinear model (Hoenig and Heisey, 1987). The authors found that age distribution derived from the model is not significantly different from the one obtained by using traditional methods. (Auth.)

B-49365

Moreno, C.A., Rubilar, P.S., **Remarks on the natural mortality of *Dissostichus eleginoides* in Subarea 48.3** [Notas sobre mortalidad natural de *Dissostichus eleginoides* de la Subarea 48.3], Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.21-29, In Spanish with English, French and Russian summaries. 12 refs.

Natural mortality (M) of *Dissostichus eleginoides* was calculated after Sparre (1989) from the data obtained during the Chilean longline fishery in Subarea 48.3 (N=7,848). The von Bertalanffy growth parameters obtained independently by three authors were used. Three cases were considered: fishing site, fishing depth and hook type. It was determined that there were no significant differences in M estimated by fishing depth and hook type with different growth parameters, although there were differences in M between fishing sites. On the other hand, when comparing various mean values of M for the different cases, it was found that there were significant differ-

ences between fishing sites and between curve hooks No.14 and straight hooks No.22. The general mean value of M calculated for the 44 analyzed situations was 0.4. (Auth.)

B-49366

Agnew, D.J., Moreno, C.A., **1991/92 fishery for *Dissostichus eleginoides* in Subarea 48.3**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.31-48, In English with French, Russian and Spanish summaries. 4 refs.

The 1991/92 longline fishery for *Dissostichus eleginoides* in Subarea 48.3 was open from Nov. 4, 1991 to Mar. 10, 1992. A total of 3,382 tonnes was taken by one Bulgarian, five Russian and eight Chilean vessels. The maximum catch taken in a five-day period was 375 tonnes. Catch rate was not influenced by fishing depth, time of day or soak time, but was dependent on type of hook and geographical position. Fish caught around Shag Rocks were larger than to the north and southeast of South Georgia. CPUE varied markedly among fleets and was about 1 kg/hook in the Chilean fleet, 0.2 to 0.4 in the Russian and 0.2 in the Bulgarian. These differences were probably a result of the different hook types used by the fleets. (Auth.)

B-49367

Parkes, G., **Notes on the use of virtual population analysis for stock assessment of the mackerel icefish, *Champsocephalus gunnari* (Lönnberg, 1906) in Subarea 48.3 for the 1990/91 and 1991/92 seasons**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.49-79, In English with French, Russian and Spanish summaries. 14 refs.

Following on from the apparent failure of the CCAMLR Working Group on Fish Stock Assessment (WG-FSA) to satisfactorily assess in 1991 the status of the *Champsocephalus gunnari* population in Subarea 48.3 using VPA, attempts were made to re-work the analysis using Laurec-Shepherd and ADAPT tuning techniques, from 1991 back to 1977. The predicted age structure, dominated in recent years by the 1987 year-class (1 year olds in 1988), was quite robust, despite the use of various combinations of survey and CPUE indices for tuning. According to the VPA the population in 1991-92 was composed of a large proportion of 5 year olds, which was not observed during the survey on *Falklands Protector* in Jan. 1992. Breakdown in the credibility of the VPA results in most recent years is attributed to the invalid assumption of constant M and contradictions in the input data. A conservative approach to management for 1991-93 is recommended, based on the results of surveys by *Falklands Protector* in 1990-91 and 1991-92. (Auth.)

B-49368

Agnew, D.J., **Choice of procedure for deciding when to close fisheries regulated by CCAMLR: a simulation model**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.81-97, In English with French, Russian and Spanish summaries. 2 refs.

The methods described in CCAMLR Conservation Measures for deciding the closure date for fisheries monitored by the Secretariat of CCAMLR have been difficult to implement because of the variation in catch rates shown by the fisheries. Non-fluctuating random and fluctuating random catch histories are simulated here and the performance of four models for making closure decisions is investigated under a variety of circumstances. The model described in the existing conservation measures is shown to have a high probability of allowing large over- or under-shoots of the TAC. The most successful model determines the trend of catch rates using linear regression over the

latest four reporting periods, and closes the fishery if these rates indicate that the TAC will be taken before the next report is received by the Secretariat. The probability of large over-shoots of the TAC is reduced if reporting periods are small (five days) and the reporting delay is minimal. It is recommended that in future conservation measures, methodologies for deciding the date of closure of fisheries should incorporate a formulation of Model 4 as given in this paper. (Auth.)

B-49369

Foote, K.G., Chu, D., Stanton, T.K., **Status of krill target strength**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.101-126, In English with French, Russian and Spanish summaries. 38 refs.

Empirical estimates for the target strength of krill are extracted from publications. These are confined to measurements on aggregations of live euphausiids, and should not be affected by a frequent cause of bias in single-animal measurements, namely thresholding. Theoretical estimates for the target strength are derived from the deformed-cylinder scattering model assuming specific sets of physical and orientational parameters, for which there is an empirical basis. The theoretical estimates show a non-monotonic dependence of target strength on both animal size and transmit frequency, notwithstanding admitted shortcomings. Some recent single-animal measurements of target strength for live euphausiids and euphausiid-related species, made under high signal-to-noise-ratio conditions, are consistent with the general pattern. Several specific recommendations are made for future improved determinations of krill target strength. Based on the comparisons, general prediction curves for the target strength are presented that are applicable to a wide range of lengths, acoustic frequencies and orientation parameters. (Auth.)

B-49370

Demer, D.A., Hewitt, R.P., **Calibration of an acoustic echo-integration system in a deep tank, with system gain comparisons over standard sphere material, water temperature and time**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.127-144, In English with French, Russian and Spanish summaries. 18 refs.

This paper outlines the theory and procedures for calibrating an echo integration acoustic system with a standard sphere. It presents the results of an extensive calibration of a Simrad EK500 scientific echosounder with a 120 kHz split-beam transducer in a refrigerated 10 m deep tank. Calibration parameters are studied in relation to sphere material (WC and Cu), water temperature (0.5 to 5.5 C), transmitted pulse length (0.1, 0.3 and 1.0 ms), target depth (0.8 to 7.5 m), and time (149 days). The total range in TS gain, including the effects of temperature, standard sphere and time, is 2.9 dB. The accuracy of the standard sphere as a reference TS value, the pulse length, the water temperature range, and equipment instabilities during the duration of a survey can contribute significant errors to the accuracy and precision of an echo integration acoustic survey. To minimize these effects, the TS gain and SA gain parameters should be meticulously and frequently measured, and matched to the pulse length used and the water temperature in the survey area. (Auth. mod.)

B-49371

Siegel, V., **Review of length-weight relationships for antarctic krill**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.145-155, In English with French, Russian and Spanish summaries. 18 refs.

Length-weight relationships for krill as well as relationships for other antarctic euphausiid species are listed for ash-free dry weight, dry weight, and wet weight. The accuracy of length-weight relationship calculations is improved when information on sex and dominant maturity stages is taken into account. The influence of seasonal changes on length-weight relationship parameters is discussed. Recommendations for possible uses of reviewed length-weight relationships are presented. (Auth.)

B-49372

Trathan, P.N., **Krill biomass in Area 48 and Area 58: recalculations of FIBEX data**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.157-181, In English with French, Russian and Spanish summaries. 25 refs.

FIBEX acoustic and length frequency data held in the BIOMASS database were used to provide estimates of mean density and biomass for the Indian Ocean sector and the West Atlantic sector as well as for FAO Statistical Area 41, and CCAMLR Subareas 48.1, 48.2, 48.3, 48.6 and Division 58.4.2. Density estimates were calculated using the target strength relationships used at the original FIBEX acoustic workshop. Estimates for the different areas were also calculated using the target strength relationships of Green et al. (1990). The new estimates were on average 4.76 times larger than the old estimates for those cruises (7 out of the 9 considered) that used an echosounder frequency of 120 kHz. (Auth.)

B-49373

Ichii, T., Ishii, H., Naganobu, M., **Abundance, size and maturity of krill (*Euphausia superba*) in the krill fishing ground of Subarea 48.1 during the 1990/91 austral summer**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.183-199, In English with French, Russian and Spanish summaries. 14 refs.

Acoustic and net sampling surveys for krill were conducted north of the South Shetland Is. from Jan. 18 to Feb. 3, 1991. Distinct offshore-inshore heterogeneities in abundance and maturity of krill were observed. The survey area was divided into four zones: oceanic, slope frontal, neritic and nearshore zones. The mean density of krill was low in the oceanic zone, intermediate in the frontal and neritic zones, and extremely high in the nearshore zone. The last zone corresponds to the shelf break or the shelf area where topographic eddies were generated, suggesting that hydrodynamic convergence might be responsible for accumulation of krill in this zone. The total biomass over the survey area was estimated to be 1.59 ± 0.45 million tonnes (95% confidence limit), of which 1.22 ± 0.42 million tonnes were concentrated in the fishing ground (frontal+neritic+nearshore zones). As for maturity stages of krill, spawning krill (modal body length 49 mm) were dominant in the oceanic and frontal zones, whereas less mature krill (modal length 45 mm) dominated in the neritic and nearshore zones. Juveniles, which were scarce in the survey described, were found restricted mainly to the nearshore zone. Gravid females were exceedingly abundant in the slope frontal zone, but were nearly absent in the neritic and nearshore zones. (Auth. mod.)

B-49374

Vagin, A.V., Makarov, R.R., Men'shenina, L.L., **Diurnal variations in biological characteristics of krill, *Euphausia superba* Dana, to the west of the South Orkney Islands, 24 March to 18 June 1990, based on data reported by a biologist-observer**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.201-222, In English with French, Russian and Spanish summaries. 9 refs.

Investigations of diurnal variations in the size composition of *Euphausia superba* were carried out on the commercial trawler *Grigory Kovtun* near the South Orkney Is. from Mar. to June 1990. An increase in the total average size of animals caught in periods of light or darkness was noted at several stations. Increases in the proportion of males in the catch, as well as in increased difference between average length of males and females in the layer fished, were indicative of these variations. Trawling depths usually corresponded to the depth of the largest concentration of krill. Within swarms males initiate diurnal vertical migrations. A gradual decrease in the average size of krill from the end of Mar. to June was observed. The following three causes of the observed variations in krill composition are considered: post-spawning mortality of large specimens; body shrinkage of krill due to a decrease in food availability; and size selectivity of krill by commercial fisheries. (Auth. mod.)

B-49375

Mujica R., A., Acuña S., E., Rivera O., A., **Krill population biology during the 1991 Chilean antarctic krill fishery**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.223-235, In English with French, Russian and Spanish summaries. 1 ref.

Population biology of antarctic krill was studied from samples taken in 1991. The fishing ground was divided into two areas: Area A, north of the South Shetland Is.; and Area B, north of Elephant I. The samples were grouped by time of capture: daytime, twilight and nighttime. The specimens were measured (total length, TL) to the nearest mm and weighed (wet weight) to the nearest 0.01 g. Mean catch-per-hour and mean catch-per-towing time were determined from a total of 419 hauls. In Area A a unimodal size frequency distribution was found; the size range was between 30 and 55 mm TL, with a mean TL of 45 mm for females and 48 mm for males. A very weak mode for juvenile specimens between 26 and 36 mm TL was also found. The sex composition was 65.1% females, 34.4% males and 1.4% juveniles. In Area B, a bimodal size frequency distribution and a larger size range were found, with one model between 32 and 55 mm TL (mean length 43 mm for females and 46 mm for males), and the other (modal length 32 mm) for juvenile specimens between 20 and 39 mm TL. Females comprised 47.1%, males 40% and juveniles 12.9%. Males were more abundant in nighttime catches while females were more abundant during daytime catches. For all catches, the yield in terms of tonnes-per-mile and tonnes-per-hour was higher during the daytime than during twilight and night in both fishing areas. These daytime catches were also made at consistently greater depths. (Auth. mod.)

B-49376

Watters, G., Hewitt, R.P., **Alternative methods for determining subarea or local area catch limits for krill in Statistical Area 48**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.237-249, In English with French, Russian and Spanish summaries. 15 refs.

CCAMLR Conservation Measure 32/X sets a 1.5 million tonne precautionary catch limit on krill in Statistical Area 48. The measure also implies an application in future of precautionary limits to subareas or local areas of this area. Nine alternative methods of determining subarea or local area krill catch limits are evaluated relative to 6 criteria: the degree to which information on biological relationships is considered; the cost of data collection; the reliability of required information; the ease of enforcement; the effects on current fishing patterns; and the potential for delay in implementing the alternative. An alternative is less likely to adversely impact dependent species (e.g., penguins and seals) if the ecological relationships between krill and their predators are explicitly considered and the potential for delayed implementation is low. Therefore, the authors consider the following tradeoff to be important: choosing a biologically explicit alternative and delaying implementation, or choosing a biologically unrealistic alternative and implementing a management scheme immediately. Other tradeoffs may be equally important. Two of the alternatives (i.e., protective zones and critical periods) are unsatisfactory only because they would alter current fishing patterns. These two alternatives could be implemented immediately if the CCAMLR Member nations are willing to tolerate changes in current fishing patterns. (Auth. mod.)

B-49377

Marschoff, E., Gonzalez, B., **Homogeneity of Adélie penguins as krill samplers**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.253-257, In English with French, Russian and Spanish summaries. 4 refs.

A nested ANOVA design was used to measure the variance component due to differences among individual Adélie penguins in the length of krill eaten, using data from Hope Bay. The variance component -0.26 was not significantly different from zero ($F=0.093$; $P=0.54$). This finding supports the argument for using individual penguins to estimate parameters of the prey population without discriminating by sex, weight or other factors pertaining to the predator. (Auth.)

B-49378

Agnew, D.J., **Can we use discriminant function analysis to sex penguins prior to calculating an index of a morphometric characteristic?**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.259-272, In English with French, Russian and Spanish summaries. 8 refs.

In sexually dimorphic species, morphometric characteristics have separate distributions for males and females, and these often overlap. Whilst discriminant analysis can be used to determine the sex of individuals, it is only able to correctly sex a certain proportion of birds. Two overlapping normal distributions are used to show that there is a difference between the real mean characteristic for a sex, and the apparent mean derived by sexing the birds using discriminant analysis. When discriminant functions are able to correctly determine the sex of birds with greater than 80% success, the difference between the true and apparent mean is likely to be undetectable if fewer than 600 birds are sampled. Therefore, under most normal sampling regimes a discriminant function with greater than 80% success may be used to derive statistically robust estimates of male and female characteristics. Combining all data for both sexes is considered as a procedure for avoiding the necessity of sex determination. However, uncertainty in sex ratios can lead to considerable Type I and Type II errors. Lack of knowledge about the sex ratio between years makes combining the data a very doubtful procedure; use of a discriminant function to determine sex is recommended as being most practically robust. (Auth.)

B-49379

Ichii, T., **Differences in distribution and population structure of krill (*Euphausia superba*) between penguin and fur seal foraging areas near Seal Island**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.273-285, In English with French, Russian and Spanish summaries. 9 refs.

Shipboard tracking studies of krill-eating predators (penguins and female fur seals) near Seal I. were conducted to identify and evaluate their foraging areas during early Jan. 1990-91. Penguin foraging areas were found in inshore regions where krill frequently occurred, but higher density areas of krill were rather limited. In contrast, fur seal foraging areas were found in offshore regions where krill occurred only occasionally but in large aggregations of higher densities (above 250 g/sq m). In the inshore foraging areas krill undertake diurnal vertical migrations, tending to be at a deeper range from 50 to 100 m in the day while at a shallower range from 20 to 50 m at night. In the offshore foraging areas krill do not undertake any diurnal vertical migrations, staying close to the surface throughout the day. Horizontal and vertical distributions and population structure of krill were totally different in the foraging areas of penguins and fur seals. The reasons why fur seals choose offshore instead of inshore foraging are discussed. (Auth. mod.)

B-49380

Agnew, D.J., **Distribution of krill (*Euphausia superba* Dana) catches in the South Shetlands and South Orkneys**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.287-303, In English with French, Russian and Spanish summaries. 27 refs.

A set of concentric zones of 20 km width was defined around selected colonies of penguins distributed around the coasts of the South Shetland and South Orkney Is. Krill catches in these zones are shown to have a consistent pattern in Subarea 48.1 but an unpredictable distribution in Subarea 48.2. About 50% of the catch in Subarea 48.1 from Dec. to Mar. was taken within 40 km of the coast, and 90% within 80 km in all years 1988 to 1991. In 1987, 1988 and 1991, 75% of the catch in Subarea 48.2 between Dec. and Mar. was taken within 80 km of colonies in the South Orkneys. Estimates of consumption rates, foraging ranges and population sizes from the literature are used to show that for some years catches within 100 km of predator colonies between Dec. and Mar. may be up to 45% of the land-based predator consumption. Whilst the normal ratio of catch to consumption is relatively low (less than 27%), the fishery may have to increase by a factor of 2 or 3 before ratios of catch to consumption approach maximum sustainable levels. Any competition between the fishery and predators as a result of large increases in catch is likely to emerge in areas of high overlap between predators and the fishery earlier than would be expected, considering the fishery as a whole. (Auth.)

B-49381

Sushin, V.A., Myskov, A.S., **Location and intensity of the Soviet krill fishery in the Elephant Island area (South Shetland Islands), 1988/89**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.305-335, In English with French, Russian and Spanish summaries. 7 refs.

This paper analyzes fine-scale data from the Soviet krill fishery off Elephant I. (Subarea 48.1) from Nov. 21, 1988 to Mar. 25, 1989. Although the total catch of the USSR in this season reached a maximum, for the last nine seasons the total fishing intensity by the USSR around Elephant I. has been low. In 1988-89 only one standard fishing vessel operated in the area over 40% of the time. The highest catch-per-

unit-effort was observed in Jan. 1989 (7.7 tonnes per hour of trawling on average), and the lowest in Nov. 1988 (3.5 tonnes per hour of trawling on average). The rate of the northeast drift of krill concentrations, calculated on the basis of vessel relocation, was from 9.7 to 11.1 km/day (11 to 13 cm/sec). An analysis of the location of fishing grounds by five-day periods showed that the areas in which the fleet operated overlap a minor part of the foraging zones of krill predators. Based on this, and taking into account the low fishing intensity, it was concluded that the current krill fishery does not significantly affect krill-eating seals and birds. (Auth. mod.)

B-49382

Kerry, K.R., Clarke, J.R., Else, G.D., **Foraging range of Adélie penguins at Béchervaise Island, Mac. Robertson Land, Antarctica, and its overlap with the krill fishery**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.337-344, In English with French, Russian and Spanish summaries. 11 refs.

The foraging ranges of 6 female and 4 male Adélie penguins breeding at Béchervaise I. were determined by satellite tracking using the Argos system. Birds were tracked over four foraging trips (2 females and 4 males) during the incubation period (Nov. to Dec. 1991) and 17 trips (4 females and 2 males) throughout Jan. 1992 when birds were feeding chicks. Most birds made foraging trips to the continental shelf break approximately 110 km distant at its closest point. Birds feeding chicks also made journeys of one to two days ranging up to 12 km after Jan. 17. Concentrations of krill, which have in the past been the subject of a fishery, occur along the shelf break zone where the birds were foraging. There is potential for overlap between the foraging range of Adélie penguins breeding along the Mac. Robertson Land coast (approximately 150,000 pairs) and any future harvest of krill in the region. The foraging range of the birds at Béchervaise I. considerably exceeds the 15 to 50 km determined for birds in the South Shetland and South Orkney Is. and reflects the distance offshore of krill, one of the major food sources. (Auth.)

B-49383

Constable, A.J., **CCAMLR ecosystem monitoring and a feedback management procedure for krill**, Scientific Committee for the Conservation of Antarctic Marine Living Resources. Selected scientific papers 1992, Hobart, Tasmania, CCAMLR, 1992, p.345-350, In English with French, Russian and Spanish summaries. 19 refs.

The CCAMLR Ecosystem Monitoring Program has been developing a technique which might detect short-term declines in land-based predator performance (e.g., reproductive performance) that may be attributable to loss of prey through fishing activities. The principal fishery in the CCAMLR Convention Area is the krill fishery and this paper examines ways in which the information being obtained from the Ecosystem Monitoring Program might be incorporated into a feedback management strategy for this fishery. (Auth.)

B-49387

Peck, L.S., Bullough, L.W., **Growth and population structure in the infaunal bivalve *Yoldia eightsi* in relation to iceberg activity at Signy Island, Antarctica, Marine biology**, 1993 117(2), p.235-241, Refs. p.240-241.

Growth rates in the infaunal nuculanid bivalve mollusc *Yoldia eightsi* (Couthouy) were assessed for field populations in Factory Cove, Signy I. between Feb. and Apr. 1992. Daily increments in length (maximum shell dimension) ranged from 2.3 microns/d for a 30 mm individual to 5.1 microns/d for a 10 mm specimen. These growth rates were converted to annual increments, based on a growing season for the Signy population of around 5 months. Ages for the largest individuals in the population (35 mm in length) were calculated

to be about 65 yr. Specimens 43 mm in length have been found near this site and, if their growth rates are similar to this population, their ages would be in the order of 120 yr. Size distributions from two sites in the same *Y. eightsi* bed 300 m apart showed significant differences. Icebergs have often been seen grounded on the *Y. eightsi* bed in this study, especially on the exposed outer portion. This factor, in association with inhibition of larval settlement by high densities of large individuals, is proposed as an explanation of the observed population distributions and the absence of very large specimens in the Factory Cove population. (Auth. mod.)

B-49388

Nolan, C.P., Clarke, A., **Growth in the bivalve *Yoldia eightsi* at Signy Island, Antarctica, determined from internal shell increments and calcium-45 incorporation**, *Marine biology*, 1993 117(2), p.243-250, Refs. p.249-250.

The growth rate of the infaunal nuculanid bivalve *Yoldia eightsi* at Factory Cove, Signy I. was estimated from internal shell increments and Ca-45 incorporation of individuals collected monthly from Dec. 1987 to Apr. 1989. Acetate peels of etched shells revealed clear first-order increments, with less well defined narrower second- and third-order increments. A slow growth rate, with a maximum shell height of 22.3 mm (equivalent to a shell length of 35.6 mm) being reached at an age >60 yr, was estimated. The size-frequency distribution of 1521 individuals pooled from winter (July to Oct.) samples revealed a distinct lack of smaller (younger) individuals, possibly reflecting poor recruitment in areas of dense adult populations. The largest shell recovered in the samples was 33.5 mm in length, with an estimated age of 52 yr. Short-term Ca-45 incorporation experiments indicated a mean daily rate of growth increment of 3.8 microns for individuals of 12 mm shell height, which matches the proposed annual growth rate if growth is assumed to occur for about 150 d each year and the first-order increments are assumed to be annual. (Auth. mod.)

B-49389

Ledoyer, M., **Cumacea (Crustacea) collected in the Weddell Sea during EPOS 3** [Cumacea (Crustacea) de la campagne EPOS 3 du R.V. *Polarstern* en mer de Weddell, Antarctique], *Journal of natural history*, Sep.-Oct. 1993 27(5), p.1041-1096, In French with English summary. Refs. p.1092-1096.

In the Weddell Sea cumaceans are well diversified, with 29 species or subspecies caught during the EPOS 3 cruise. Nine of these are new species or subspecies: *Diastylis anderssoni armata*, *D. enigmatica* and *D. galeronae*, *Leucon polarsterni* and *L. weddelli*, *Atlantocuma elongatum* (type of the new subgenus *Antarctocuma*), *Camplaspis breviramis*, *C. excavata* and *C. quadrifentata*. One *Eudorella* remains unidentified. *Diastylis alvesae* nom. nov. is proposed for *Diastylis hirsuta* Petrescu and Bacescu, 1990 homonym of *D. hirsuta* Lomakina, 1955 but which is not the same species. Qualitatively, between 200 and 2000 m there are three patterns of species distribution: species with a large depth range (200 to 1000-2000 m), deep-water species which inhabit deposits around 500 m, and species living from 200 to 500-600 m. The presence of an ice shelf does not permit investigation of littoral bottoms (0-200 m) in this area. Quantitatively, in the Weddell Sea cumaceans are abundant. Multibox-corer samples indicate a population density of 74 individuals/sq m between 200 and 1200 m. (Auth.)

B-49394

Bruni, V., **Further observations on the microbial population in Terra Nova Bay**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.107-122, 9 refs.

In continuing the research undertaken in the previous Italian campaign, further studies were carried out on the ecology of microbial

population in Terra Nova Bay to illustrate the temporal variations of the microbial biomass during the antarctic summer. Particular attention was paid to the picoplanktonic communities, also in order to investigate their interrelation with some of the main biotic and abiotic factors of the antarctic marine ecosystem. Research activity was programmed, as far as the strategy of sampling was concerned, together with the "Ecology of Phytoplankton" research group, so as to examine existing interrelations among physical, chemical and biological parameters, and to study the dynamics of the microbial loop and the response of the microbial community to phytoplankton development. Resulting data are presented in tables.

B-49396

Fonda Umani, S., Chemelli, M., Monti, M., **Microzooplankton populations' temporal trend in Terra Nova Bay (austral summer 1989/90)**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.153-178, 14 refs.

The second year of research on microzooplankton populations in Terra Nova Bay was devoted to following their temporal trend in two coastal sampling stations. The main purpose of this research was to follow the quantitative and qualitative modification of the heterotrophic fraction throughout the period of study in relation to the phytoplankton evolution. Preliminary observations include taxonomic analyses, the temporal trend, vertical distribution and fecal pellets. Preliminary conclusions and tabulated data are given.

B-49397

Carli, A., Feletti, M., Mariottini, G.L., Pane, L., **Contribution to the study of copepods collected during the Italian oceanographic campaign in Antarctica 1989-90**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.179-210, 11 refs.

The main purpose of the Zooplankton Research Group participating in the Italian antarctic expedition of 1989-90 was to contribute to the knowledge of dynamics and structure of copepod populations living in the South Pacific Ocean and in the Ross Sea. In particular, the distribution and composition of main representative species are reported and shown in tables.

B-49398

Carli, A., Pane, L., **Larval crustacean decapods collected during the Italian oceanographic campaign in Antarctica 1989-90**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.211-216, 9 refs.

The aim of this research was to contribute to the study of the antarctic planktonic biocenoses, and particularly to increase the knowledge about larval crustacean decapods occurring in the zooplankton samples collected during the Italian antarctic expedition in 1989-90. On the whole, 27 stations placed along the New Zealand-Terra Nova Bay course were examined. Some information concerning the sampling stations are shown in tables; sampling depths and quantitative data are also tabulated. A total of 49 specimens were classified.

B-49399

Zunini Sertorio, T., Licandro, P., Ricci, F., Giallain, M., **Study on Ross Sea copepods**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.217-246, 17 refs.

A study of copepods had been programmed by the Italian Antarctic Expedition of 1989-90 as part of its surveys on zooplankton to

provide information on spatial distribution, amount and population structure in relation to environmental variables. The zooplankton surveys were carried out during the southern summer between 50 and 75S, in a zone extending from the sea south of New Zealand to the Ross Sea. Most of the 27 stations lie in the Ross Sea. Adult specimens were classified according to species whenever possible; when it proved impossible, the name of the genus was followed by sp. Young specimens were classified according to genus. The total length and the cephalothorax length were measured in all specimens for two purposes: to obtain the size spectrum of the population and to be able to calculate the biomass of the copepods on the basis of their size-weight ratio. The number of copepods is expressed in terms of volume of filtered water or alternatively in terms of water surface. Tabulated data are included.

B-49400

Benassi, G., **Planktonic Ostracoda in the southern ocean and in the Ross Sea: 1989-90 campaign**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.247-300, 11 refs.

This report represents the results of the taxonomic analysis of Ostracoda drawn from zooplankton samples collected during the 1989-90 Italian Antarctic Expedition in the southern ocean and in the Ross Sea. Ostracoda were identified at the species level. The overall Ostracoda density and the densities of the different species were calculated for each sample, and their distribution in the sampling area was analyzed. A preliminary comparison was then made with the planktonic Ostracoda distribution pattern observed during the 1987-88 oceanographic campaign in the Ross Sea. A total of 572 samples at 58 stations was collected. Tabulated data are presented, including an Appendix with results of systematic analysis.

B-49401

Guglielmo, L., **Zooplankton ecology in the southern ocean**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.301-468, 13 refs.

During the Italianartide cruise in the Pacific sector of the southern ocean from New Zealand to the Ross Sea zooplankton was collected in 27 stations across the Antarctic Convergence. The main purpose of the cruise was to study the zooplankton communities in the northern, intermediate and southern zones which coincide with the distribution of water masses and with the patterns of ice cover. Higher biomass occurs near the Antarctic Convergence and decreases toward the south. The intermediate zone is the seasonal pack-ice area, which is ice covered in winter/spring and ice free in summer-/autumn. This region is the most productive in the southern ocean and *Euphausia superba* is the dominant species. In the southern zone zooplankton abundance and biomass are low. The small neritic euphausiid species *Euphausia cristallorophias*, the pteropods *Clione* sp. and the larval stages of the notothenid fish *Pleurogramma antarcticum* are common.

B-49402

Azzali, M., Kalinowski, J., Cosimi, G., Castagnani, R., **Distribution of krill biomass in the Ross Sea, December 89- January 90**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.469-507, 2 refs.

The main aims of the Echosurvey Group during the Italian National Antarctic Expedition 1989-90 were as follows: estimation of biomass of krill; determination of the horizontal and vertical distribution of krill aggregations and their relation to the environmental conditions (pack-ice, lights, hydrological fronts); and characterization of the forms of krill occurrence. The results are presented in tables and graphs.

B-49431

Watanuki, Y., Kato, A., Mori, Y., Naito, Y., **Diving performance of Adélie penguins in relation to food in fast sea-ice areas: comparison between years**, *Journal of animal ecology*, 1993 62(4), p.634-646, 47 refs.

Between-year variation in Adélie penguin foraging behavior was studied using time-depth recorders at a colony in Lützow- Holm Bay in the summers of 1990 and 1991 in areas where fast sea- ice remained. Poor chick survival and growth, long foraging trip duration and low meal delivery rate indicate that food availability was poor in 1991 when compared to 1990. However, mass of food brought to chicks per shore visit and rate of decrease of parental mass did not differ between these years. These data show that when food was less abundant, Adélie penguin parents increased the duration of their foraging trips, thereby decreasing meal delivery rate, but did not increase total diving effort to compensate for poor food availability. The reasons for this might be that (i) their foraging sites were highly restricted to small ice holes or tide cracks; therefore, prey abundance within sites might decrease rapidly by depletion and the penguins might not be able to get more food even if they forage for a longer period; or (ii) they have a priority to maintain their body condition for their own future survival at the expense of offspring production. (Auth. mod.)

B-49432

Ashford, J.R., Robinson, K., White, M.G., **Method for preparing large numbers of otolith sections for viewing by scanning electron microscope**, *ICES journal of marine science*, May 1993 50(2), p.227-229, 12 refs.

In an investigation of the age structure of a population of *Notothenia coriiceps* Richardson at the South Orkney Is. the microstructure of otoliths was examined. Progress is reported on a method for processing large numbers of otoliths using a scanning electron microscope (SEM). Compared with previous SEM techniques, which normally prepare otoliths individually for viewing, this allowed larger sample sizes to be examined. Compared with similar light microscope techniques, this method gave enhanced resolution, particularly for discerning edge structures, and thus may facilitate present methods of ageing fish populations, especially for fishery work in the Antarctic where otoliths are often small and difficult to interpret when using conventional techniques. (Auth.)

B-49433

Davey, M.C., Rothery, P., **Primary colonization by microalgae in relation to spatial variation in edaphic factors on antarctic fellfield soils**, *Journal of ecology*, 1993 81(2), p.335-343, 35 refs.

The causes of variations in the composition of microalgal communities on frost-sorted soil polygons on Signy I. were investigated, based on analyses of physical and chemical conditions and microalgal communities from 65 polygons. Interpolygon variations in all environmental factors measured were small and not much greater than the intrapolygon variations. Microalgal diversity was low. Only 7 taxa occurred in sufficient numbers to be included in statistical analyses, two of which, *Nostoc* spp., were found on only one polygon. The filamentous cyanobacterium *Phormidium autumnale* occurred on all polygons and usually provided the largest component of total biovolume. Microalgal communities were qualitatively constant within polygons but varied markedly between polygons. Principal components analysis indicated that each taxon varied independently of the others, and hence it was not possible to correlate community structure with any specific environmental factor. Correlations between numbers of individual taxa and edaphic factors were low and accounted for a maximum of 18% of the observed interpolygon variation or 12% of the total variation. It is suggested that the observed differences in the microalgal communities were due to the vagaries of the colonization process and reflect the probability of successful colonization of these ecosystems by microalgae. (Auth. mod.)

B-49434

Barange, M., Miller, D.G.M., Hampton, I., Dunne, T.T., **Internal structure of antarctic krill *Euphausia superba* swarms based on acoustic observations**, *Marine ecology progress series*, Sep. 16, 1993 99(3), p.205-213, 32 refs.

Ping-by-ping acoustic data from more than 3,000 antarctic krill aggregations were analyzed and patterns in density distribution within the swarms examined. It was observed that krill were neither randomly nor evenly distributed within the swarms, particularly in larger swarms (extending for more than about 35 m along track), where there was significant evidence of krill concentration in the center. Linear trends in density across swarms were also common. In swarms of intermediate size (15 to 35 m along track), these linear effects were predominantly negative, perhaps indicating reaction of the swarms to the approaching ship. Significant linear effects were present in the larger swarms as well, but in these, positive gradients were as common as negative ones. The effects of beam width on estimates of swarm density and internal structure made by echosounder are examined, and a method of correcting for these effects is described. It was found that if no beam width correction is applied, artefacts are introduced into the apparent density structures, and the mean swarm density can be underestimated by as much as 50%. (Auth.)

B-49435

Lopez, M.D.G., Huntley, M.E., Lovette, J.T., ***Calanoides acutus* in Gerlache Strait, Antarctica. I. Distribution of late copepodite stages and reproduction during spring**, *Marine ecology progress series*, Oct. 5, 1993 100(1-2), p.153-165, 48 refs.

Calanoides acutus (Giesbrecht) in 0 to 290 m stratified samples collected repetitively at 23 stations in Gerlache Strait in Nov. 1989 consisted of stage III to VI copepodites (CIII to CVI). All stages except CV decreased in abundance through the 3.5 wk sampling period. Vertical distributions of all copepodite stages remained consistent, with no evidence of diel vertical migration. Centers of mass were as follows: female CVI, 44 m; CV, 66 m; CIV, 127 m; male CVI, 189 m. Progressive ovarian maturation in adult females was not correlated with ambient chlorophyll *a* concentrations. Mean daily egg production at 16 stations over a 3 d period in late November was a hyperbolic function of 0 to 150 m integrated chlorophyll *a* concentrations. (Auth.)

B-49439

Spinelli, G.R., Grogan, W.L., Jr., ***Borkenthelea*, a new predaceous midge genus from subantarctic Argentina and Chile (Diptera: Ceratopogonidae)**, *Proceedings of the Entomological Society of Washington*, July 1993 95(3), p.321-326, 10 refs.

Borkenthelea nothofagus, a new genus and species of predaceous midge of the tribe Ceratopogonini, is described and illustrated. This new genus from the temperate subantarctic *Nothofagus* forest of Argentina and Chile is compared with other genera in the Ceratopogonini. (Auth.)

B-49440

Worsfold, T.M., Avern, G., Ponder, W.F., **Shallow water rissoiform gastropods from Tristan da Cunha, South Atlantic Ocean, with records of species from Gough Island**, *Zoologica scripta*, Apr. 1993 22(2), p.153-166, 13 refs.

Shallow water rissoiform gastropods collected by the Norwegian Scientific Expedition (1937-1938) to Tristan da Cunha are described. The fauna consists of *Powellisetia* cf. *philomelae* (Watson) (Rissoiidae), three new species of *Eatoniella*, *E. trochiformis*, *E. lineata*, and *E. tristanensis* (Eatoniellidae), two new species of *Onoba*, *O. crassicornata* and *O. tristanensis* (Rissoiidae) and *Rissoella* cf. *irma* (Bartsch)

(Rissoellidae). A small collection from Gough I. is also described, containing three species referred to *Onoba*, one of which is described as new, *O. merelinoides*, and a species of *Eatoniella*. The biogeographic relationships of the fauna are briefly discussed. (Auth.)

B-49447

Sinque, C., Costa, L.M., Koblitiz, S., **Summer distribution and abundance of fish larvae related with environmental variables (temperature and salinity) in the Admiralty Bay, Antarctica**, *Arquivos de biologia e tecnologia*, 1992 35(3), p.613-622, 12 refs.

Distribution and abundance of the fish larvae community in Admiralty Bay were investigated, based on austral summer plankton samples collected by the research vessel *Prof. W. Besnard* at 15 stations. A total of 550 larvae comprising 5 taxa were found. Nototheniidae represented by *Nototheniops larseni*, *Nototheniops nudifrons* and *Notothenia kempfi* was the dominant family, representing over 95% of all the larvae caught. Harpagiferidae and Myctophidae, with a single species each, were represented by *Harpagifer bispinis* (2.36%) and *Electrona antarctica* (0.18%), respectively. The stations, located in an area strongly influenced by Bransfield Strait coastal waters, showed high abundance and diversity of species. The environmental variables (temperature and salinity) were recorded to determine their relationship with the occurrence and abundance of the larvae. (Auth.)

B-49449

Zauke, G.P., Petri, G., **Metal concentrations in antarctic crustacea: the problem of background levels**, *Ecotoxicology of metals in invertebrates*, edited by R. Dallinger and P.S. Rainbow. Proceedings of a session held at the First SETAC-Europe Conference, Sheffield, U.K., Apr. 7-10, 1991, Boca Raton, FL, Lewis Publishers, 1993, p.73-101, 53 refs.

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There is growing evidence that the antarctic environment seems not to be endangered as yet by global anthropogenic input of chemicals. It has been reported, for example, that heavy metals in snow cores from Antarctica have not increased since the end of the last century. However, attention has been focused on the validity of such data, which may be obscured by analytical and contamination problems or local emissions. The goal of this paper is to evaluate whether metal concentrations in mesopelagic and benthic crustaceans from the antarctic ocean may be suitable as background levels, as an aid for interpretation of data from areas influenced by man. As yet, there is no evidence that such marine organisms from the antarctic ocean are influenced by anthropogenic input of chemicals, except perhaps on small local scales. It is concluded that accumulated metal concentrations in antarctic crustaceans should not be used as global background levels in monitoring studies. Evaluation of regional background levels for appropriate groups of organisms is recommended, in line with the concept of "water quality" developed for freshwaters.

B-49456

Marquez, M.E.I., **Serum protein and crystalline-lens electrophoresis in *Dissostichus eleginoides*** [Análisis electroforético de las proteínas séricas y del cristalino del ojo de la merluza negra (*Dissostichus eleginoides*)], *Buenos Aires. Instituto Antártico Argentino. Contribución*, 1992 No.409, 30p., In Spanish with English and French summaries. Refs. p.18- 22.

Serum protein fractions from the antarctic and subantarctic fish *Dissostichus eleginoides* were analyzed by electrophoresis on cellulose acetate to determine and quantify their different compounds. The electrophoretic mobilities were compared with reference human plasma and serum. A quantitative evaluation was carried out dosing the proteinograms by densitometry against human plasma and serum

plus a commercial standard as controls. The protein extracts from the eyes of the fish were separated into a number of compounds using the isoelectric focusing technique (IEF) on polyacrylamide gel. A complex and specific protein pattern was obtained. The results show the possible application of the methodology for species based on a biochemical criterion. (Auth.)

B-49465

Capella A., J., Flórez-González, L., **Tracking of the humpback whale** [Tras el rastro de la ballena jorobada], *Boletín antártico chileno*, Apr. 1993 12(1), p.2-4, In Spanish. 11 refs.

A brief review is presented of the history of whaling in Antarctica, the international cooperation in taking whale-protective measures and in studying their identifying characteristics and migratory behavior. Suggestions are made urging Chile to develop an antarctic research program using the newest methods available for the study of whales.

B-49473

Nozaki, H., Ohtani, S., ***Gonium sociale* (Volvocales, Chlorophyta) from Antarctica**, *Japanese journal of phycology*, Sep. 1992 40(3), p.267-271, 11 refs.

Detailed accounts of *Gonium sociale* (Dujardin) Warming originating from Antarctica were obtained, based on cultured materials isolated from a meltwater pool near the Great Wall Station. The alga exhibited vegetative colonies, which were essentially the same as those of *G. sociale* previously reported from non-antarctic regions, except for its somewhat larger size. In addition, the effects of temperature on the growth of the antarctic plant were studied at 5-25 C, in comparison with those of a Japanese strain of *G. sociale*. The antarctic strain was able to grow normally at 5, 10, and 15 C, but showed abnormal colonies at 10 C and did not grow at 25 C. In contrast, the Japanese strain produced normal vegetative colonies at 5-25 C. This is the first report on identification of antarctic colonial Volvocales at the species level. (Auth.)

B-49483

Wynn-Williams, D.D., **Is there life on Mars (Glacier)?**, *NERC news*, July 1993 No.26, p.24-25.

Results of biological fieldwork carried out in the Viking Valley on Alexander I. are discussed, covering the following achievements: determination of the diversity of the biota; establishment of long-term cloches (small greenhouses) to detect responses of the biota to environmental change, especially climatic warming and enhanced UV-B radiation within the ozone "hole"; and establishment of an automatic microclimate station to monitor potentially influential parameters, including solar and UV radiation and ground temperature inside cloches.

B-49486

Fedak, M.A., McConnell, B.J., **Observing seals by satellite**, *NERC news*, Apr. 1993 No.25, p.26-28.

The article describes the open ocean behavior of southern elephant seals (*Mirounga leonina*), their long distance travel and diving, in relation to physical and biological aspects of the oceanic environment.

B-49489

Holm-Hansen, O., Helbling, E.W., Lubin, D., **Ultraviolet radiation in Antarctica: inhibition of primary production**, *Photochemistry and photobiology*, Oct. 1993 58(4), p.567-570, 22 refs.

With the seasonal formation of the ozone hole over Antarctica, there is much concern regarding the effects of increased solar UV-B radiation (280-320 nm) on the marine ecosystem in the southern ocean. *In situ* incubations of natural phytoplankton assemblages in

antarctic waters indicate that under normal ozone conditions, UV-B radiation is responsible for a loss of approximately 4.9% of primary production in the euphotic zone, whereas UV radiation with wavelengths between 320 and 360 nm causes a loss of approximately 6.2%. When combined with data on the action spectrum for photoinhibition by UV radiation, the authors' data suggest that the enhanced fluence of UV-B radiation under a well-developed ozone hole (150 Dobson units) would decrease daily primary productivity by an additional amount up to 3.8%. Calculations that take into consideration the extent and duration of low stratospheric ozone concentrations during Sep. to Nov. indicate that the decrease in total annual primary production in antarctic waters due to enhanced UV-B radiation would be up to 0.20%. (Auth.)

See also:

D-48228 D-48852 E-45767 E-47383 E-47420 E-47421 E-47567 E-47740 E-47746 E-47754 E-47755 E-47758 E-47759 E-47762 E-47763 E-47772 E-47773 E-47854 E-47979 E-47980 E-47981 E-47982 E-47983 E-47984 E-47985 E-47986 E-48000 E-48025 E-48064 E-48065 E-48067 E-48068 E-48069 E-48137 E-48164 E-48266 E-48287 E-48288 E-48289 E-48330 E-48362 E-48465 E-48477 E-48641 E-48710 E-48837 E-48838 E-48860 E-48953 E-48977 E-49029 E-49185 E-49278 F-47877 F-48347 F-48537 F-48728 F-48767 G-48036 G-48678 G-48679 G-48921 G-48929 G-48930 G-48933 G-48934 G-48936 H-47705 I-47749 I-48147 I-48156 I-48265 I-48284 I-48671 I-48803 I-48855 I-49161 J-47430 J-47438 J-47448 J-47449 J-47456 J-47458 J-47459 J-47460 J-47603 J-47614 J-47660 J-47661 J-47662 J-47752 J-47756 J-47764 J-47766 J-47769 J-47770 J-47862 J-47871 J-48026 J-48041 J-48051 J-48150 J-48230 J-48349 J-48378 J-48385 J-48454 J-48468 J-48479 J-48673 J-48674 J-48727 J-48877 J-49035 J-49104 J-49156 J-49202 J-49390 J-49393 J-49395 J-49471 J-49472 J-49480 J-49487 M-47378 M-48198 M-48199 M-48401 M-48576 M-48584 M-48587 M-48664 M-48667 M-49002 M-49217 M-49438 M-49469

C. CARTOGRAPHY

C-47429

Li, D., Yuan, X.X., **Bundle block adjustment with small format air photographs on surveying and mapping on Antarctica**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.27-35, In Chinese with English summary. 5 refs.

The study of an air photogrammetric method, using a non-metric camera loaded in a light plane, is discussed. A combined adjustment program system (WuCAPS), based on a 386 personal computer, which was developed by the Department of Photogrammetry and Remote Sensing at Wuhan Technical University of Surveying and Mapping, is described. Some adjusted results with small format air photographs for the Zhongshan Station's project in Antarctica are given. These photos were taken with a non-metric camera of Bronika SQ-A 120 type, made in Japan. The photo scale is 1:40,000. By using the bundle block adjustment with self-calibration of WuCAPS, the planimetric accuracy reaches ± 2.829 m, and the height accuracy reaches ± 4.973 m on the ground. (Auth. mod.)

C-47733

McAdoo, D.C., Marks, K.M., **Resolving marine gravity with ERS-1 satellite altimetry**, *Geophysical research letters*, Nov. 20, 1992 19(22), p.2271-2274, 8 refs.

To estimate how well ERS-1 data from the 35-day repeat mission can resolve fine structure in the marine geoid or gravity field, the authors compare along-track gravity and gridded gravity fields derived from ERS-1 fast delivery altimeter data to those computed from Geosat Geodetic Mission altimeter observations in the southern ocean. Single passes of ERS-1 data can resolve along-track gravity anomalies with wavelengths as short as 28-30 km (i.e., comparable to Geosat). However, the ERS-1 gridded gravity field can only resolve anomalies down to 66 km (versus 18 km for Geosat). This two-dimensional resolution is limited by the larger ground track spacing (35 km at 60S) of ERS-1. To resolve fine structure in the marine gravity field it is essential to have altimeter data along more closely-spaced ground tracks. The satellite altimeter data used in this study cover a region of the southern ocean between 60-68S and 175-200E that overlies the Pacific-Antarctic ridge. (Auth.)

C-48459

Minster, J.F., Remy, F., Normant, E., **Constraints on the repetitivity of the orbit of an altimetric satellite: estimation of the cross-track slope**, *Journal of atmospheric and oceanic technology*, June 1993 10(3), p.410-419, 19 refs.

The effect of a poorly constrained repetitivity of the orbit of an altimetric satellite is analyzed. From existing data, 35% of the marine geoid slopes are found to exceed 1.5 cm/km, due either to short-distance-scale features or to the large-scale geoid. A geoid cross-track slope (CTS) can be calculated locally from the tracks inside the repetitivity band with a precision of 0.2-2 cm/km, depending on the orbit cycle and on the width of the band. This can be used as a correction but increases the noise level by at least 50%. Alternatively, the CTS can be derived from a mean sea surface. This adequately corrects for the large-scale signals but, with present mean sea surfaces, it is inadequate for the short-distance-scale features. Above continental ice, larger than 0.3% along-track slopes were encountered for more than 10% of the time above an altitude of 500 m. These slopes result mostly from undulations of the ice topography. Over one year, a median height profile inside the repetitivity band can be derived at 8-16 cm precision, depending on the number of tracks used and assum-

ing that the measurement noise is 50 cm. From one year to the next, a CTS correction needs to be applied to compare the yearly median height profiles. In each case, the precision is comparable with the expected signals (e.g., mesoscale variability of the ocean dynamic topography or climatic variation of the snow accumulation rate). These signals can, however, be recovered by space-time analysis of the data. Ice sheet topography is illustrated by reference to the Adélie Coast region of the Antarctic. (Auth. mod.)

C-48593

Balmaceda, R.C.R., **Delimitation of Antarctica** [La delimitación de la Antártida], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.279-281, In Spanish.

Of ten criteria applied in previous attempts to delimit Antarctica, the geographic criterion is briefly discussed to point out the political and physical difficulties in trying to define antarctic boundaries.

C-48594

Astiz, O.P., **Cartography and toponymy** [Cartografía y toponimia], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.283-292, In Spanish. 16 refs.

A brief history of geographic names, maps and charts of Antarctica, compiled from the 19th century to the present, is reviewed. Of 1500 maps, only 220 are dated before 1960. Their different characteristics (hydrographic, aeronautic, topographic, thematic, etc.) are described. Several steps concerning the territorial claims and compilation of maps reflecting Argentina's expressed position on Antarctica, from the present to the year 2010, are proposed.

C-48649

Rapley, C.G., **Analysis of ERS-1 altimeter data over polar ice sheets**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.235-240, ESA SP-359, 6 refs.

In this paper, ERS-1 altimeter Fast Delivery data are used to derive height maps of Greenland and Antarctica. Without the off-line waveform data it is not possible to correct these for tracker bias. However, over large areas of the ice sheets, this introduces an error which is small compared with the height resolution of the displays. Errors in the orbits and preliminary atmospheric corrections used have been reduced by averaging data over multiple repeat cycles. For Greenland, a slope-induced error correction has been applied. The maps are the most accurate yet of the regions beyond ± 72 deg. Preliminary results include the delineation of drainage basins on the Greenland ice sheet, and the observation of glaciologically interesting surface features in Antarctica. (Auth. mod.)

C-48774

Sun, J.B., Gan, X.Z., **Digital mapping produced with satellite image of Zhongshan Station area in Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.57-64, In Chinese with English summary. 9 refs.

Based on difficulties in processing satellite images of Antarctica in digital mapping, a filtering procedure to remove the streaking noise and enhance the clarity of the image is described.

C-48787

Scambos, T.A., Bindshadler, R.A., **Feature maps of ice streams C, D, and E, West Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.312-314, 5 refs.

Satellite image data reveal a wealth of features that assist in interpreting ice-flow dynamics and the flow history of the west antarctic Siple Coast region. A map of features observed in ice streams C, D, and E of the Siple Coast/Rockefeller Plateau area has been created, based on 10 overlapping Landsat thematic mapper (TM) images and one advanced very-high-resolution radiometer (AVHRR) image. This map reveals several geographic features not previously identified and emphasizes the importance of satellite image mapping in the polar regions.

C-48788

Mullins, J.L., **Advances in antarctic surveying and mapping**, *Antarctic journal of the United States*, 1991 26(5), p.314-315.

The U.S. Geological Survey's (USGS) Antarctic Surveying and Mapping Program focused its activities during the 1990-1991 season on the acquisition of global positioning system (GPS) geodetic mapping control, Doppler satellite surveying, an international GPS campaign, seismology, and Doppler satellite tracking. In addition, the USGS participated in the second phase of the Antarctic GPS Observing Campaign, the forerunner of a major international cooperative GPS observation campaign proposed for the 1991-1992 austral summer season in the Southern Hemisphere. The objectives of the international GPS campaigns are to undertake investigations to determine the relative motion between the antarctic tectonic plates and the adjoining plates, and to establish a baseline between existing and proposed antarctic Very Long Baseline Interferometry sites. Plans for the 1991-1992 GPS campaign are outlined.

C-48873

Marova, N.A., Alekhina, G.N., **Bottom relief of the Atlantic sector of the Antarctic** [Rel'ef dna atlanticheskogo sektora Antarktiki], *Antarktika; doklady komissii*, 1992 No.30, p.77-82, In Russian with English summary. 13 refs.

Generalized data on the bottom topography of the subantarctic portion of the Atlantic Ocean are summarized on a new detailed bathymetric map. The relief of the principal structures of this region, including three branches of the mid-oceanic ridge and the Bouvet triple junction, is considered. While similar to mid-oceanic ridges by their morphology, the three branches are different in their morphometric parameters. The dependence of these parameters on the spreading rate is revealed. New data on the Africa-Antarctic and America-Antarctic ridges warrant some changes of the bottom topography scheme of the southern ocean. Together with other parts of the mid-oceanic ridge in the Indian and Pacific sectors of the Antarctic, the above mentioned ridges form a natural boundary of the southern ocean. (Auth.)

C-48874

Volokitina, L.P., **Bottom relief and structure of the South Atlantic Ocean** [Rel'ef i stroenie dna iuzhnoï chasti atlanticheskogo sektora Antarktiki], *Antarktika; doklady komissii*, 1992 No.30, p.83-88, In Russian with English summary. 25 refs.

The relief and morphology of the antarctic margin in the South Atlantic Ocean sector and the Weddell Sea have been determined on

the basis of bathymetric maps and marine-geologic, seismic and magnetic data. The formation and evolution of the largest oceanic bottom structures are described. (Auth.)

C-48913

Zibordi, G., Van Woert, M.L., **Antarctic sea ice mapping using the AVHRR**, *Remote sensing of environment*, Aug. 1993 45(2), p.155-163, 31 refs.

A sea ice mapping scheme based on Advanced Very High Resolution Radiometer (AVHRR) data from the NOAA polar orbiting satellites has been developed and applied to daylight images taken between Nov. 1989 to Jan. 1990 and Nov. 1990 to Jan. 1991 over the Weddell and Ross Seas. After masking of the continent and ice shelves, sea ice is discriminated from clouds and open sea using thresholds applied to the multidimensional space formed by AVHRR Channel 2, 3, and 4 radiances. Sea ice concentrations in cloud-free regions are then computed, using the tie-point method. Results based on the analysis of more than 70 images show that the proposed scheme is capable of properly discriminating among sea ice, open sea, and clouds under most conditions, thus allowing high resolution sea ice maps to be produced during the austral summer season. (Auth.)

C-48944

Faccini, E.E., Alba, G.J., **Antarctic drifting sea ice atlas for areas restricted from 0 to 90 west longitude**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.310-317.

To facilitate naval operations in the Antarctic, a study was made of spatial distribution of the ice edge, the frequency of ice field occurrence, the ice field edges, the standard deviation of the ice field boundaries mean positions and interior channels, the mean ice concentration, and the selective concentration occurrence frequency. Results are described and shown in 6 maps drawn for the first two weeks of Jan. for the period 1973-1990.

C-48948

Ridley, J.K., Laxon, S.W.C., Rapley, C.G., Mantripp, D.R., **Antarctic ice sheet topography mapped with the ERS-1 radar altimeter**, *International journal of remote sensing*, June 1993 14(9), p.1649-1650, 6 refs.

This note describes an image derived from ERS-1 satellite altimeter fast delivery (FD) data, which corresponds to on-board height values accumulated during periods of the 3-day repeat orbit patterns. The image provides a representation of antarctic topography accurate to within the resolution of the color-height scale used for illustration, and shows excellent agreement with the best available map from existing survey data. This early result illustrates vividly the major improvement in antarctic topographic mapping which will be possible once the 35-day and 176-day orbit repeat cycles of the ERS-1 mission have been completed. (Auth. mod.)

C-48956

Rica, A.H., **Antarctica. A human odyssey confirming a hypothesis** [L'Antàrtida. Odissea humana an la confirmació d'una hipòtesi], *Revista catalana de geografia*, Sep. 1992 7(19), p.45-53, In Catalan with English and Spanish abstracts.

The author proposes a study about the discovery of the Earth starting from information obtained through historical cartography. His study is focused on the antarctic continent and therefrom he defines the periods of the history of cartography. The study's framework is the general evolution of occidental culture. (Auth.)

C-49008

Thomson, J.W., Cooper, A.P.R., **SCAR antarctic digital topographic database**, *Antarctic science*, Sep. 1993 5(3), p.239-244, 10 refs.

The antarctic digital topographic database is the outcome of a truly international collaborative project among 11 nations. Data capture was coordinated in the UK, under the auspices of the Scientific Committee on Antarctic Research (SCAR), during a two-year period. Over 200 maps at scales ranging from 1:200,000 to 1:5,000,000 were digitized for the project and reference was made to a similar number of satellite images (mostly Landsat photographic products). Editing and harmonization of the data derived from the different sources has produced a seamless map of Antarctica which has the most up-to-date coastline now available. The topographic database created, to be published on one CD-ROM, will form the foundation for future GIS needs in antarctic research. Products already derived from the database include digital elevation models and customized maps; the latter can be reproduced by research groups to meet their own mapping needs. (Auth.)

C-49069

Hinze, H., **Mapping the seafloor, status report on AWI bathymetric charts of the Weddell Sea**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.30-33, 3 refs.

DLC G890.F55R47

A summarizing report on bathymetric mapping activities at the Alfred Wegener Institute (AWI), including aspects of a multi-beam survey by RV *Polarstern* and Weddell Sea bathymetry, is given. AWI is scheduled to compile several computer-based bathymetric charts for the Weddell Sea in the scale 1:1,000,000 (Bathymetric Charts of the Weddell Sea, BCWS) following the index of the GEBCO Ocean Plotting Sheet (OPS). Starting at 60S the BCWS sheets cover 6 deg in latitude and between 20 and 40 deg in longitude each. The charts are in Mercator projection with standard parallels at 65, 70, and 76 deg latitude. A comprehensive bathymetric chart in stereographic projection will cover the entire Weddell Sea at a scale of 1:3,000,000.

C-49338

Kaminuma, K., **Location and elevation of Syowa Station, Antarctica**, *Antarctic record*, July 1993 37(2), p.169-175, In Japanese with English summary. \$12 refs.

The locations and elevations of Showa Station are noted for future reference. All data presented in this report were surveyed from the astronomical geodetic point which was established in 1957. The details are as follows: the locations of the pendulum gravity station and seismic vault were determined by surveying and leveling from the astronomical geodetic point; the locations of the gravity point in the Earth Science Laboratory, the absolute gravity point and the tide gauge were determined from the geographical map of East Ongul I. (1:5000). Elevations of those points were determined by leveling from the tide gauge reference point. (Auth.)

C-49462

Villanueva López, V., **Cartographic elevation and geographic information system on Fildes Peninsula, King George I.** [Levantamiento cartográfico y sistema de información geográfica de la península Fildes, Isla Rey Jorge], *Boletín antártico chileno*, Oct. 1993 12(2), p.13-17, In Spanish.

Field Project No.153, carried out by INACH on Fildes Peninsula to collect topographic and geodetic data for the development of a digital data base and a geographic information system on South Shetland Is., is described.

C-49463

Torres N., D., **Sketch of Cape Shirreff on Livingston I.** [Croquis de Cabo Shirreff, Isla Livingston, Archipiélago Shetland del Sur, Antártica], *Boletín antártico chileno*, Oct. 1993 12(2), p.44, In Spanish.

Cape Shirreff has become a site of population recovery of the seal *Arctocephalus gazella*, for which the Cape was given a site-of-special-scientific-interest status by the Antarctic Treaty Consultative Party, and a historical monument to the memory of the drowned crew of the ship *San Telmo* was erected there in Feb. 1993. In view of this, the INACH party working on the Cape prepared a map on the 1:4200 scale to facilitate research on the Cape and to establish additional Chilean sovereignty claims to it. The map is presented with the brief article.

C-49485

Thomson, J.W., Cooper, P., Fox, A., **Customised digital maps of Antarctica**, *NERC news*, Apr. 1993 No.25, p.16-17.

The program for the preparation of the first 'seamless' digital map of Antarctica was undertaken in Cambridge by a consortium of three institutes: the British Antarctic Survey, the Scott Polar Research Institute, and the World Conservation Monitoring Centre. Such a map of Antarctica would provide scientists from all disciplines with a topographic database for international and multi-disciplinary research on the continent. The database was completed in Sep. 1992. In total, more than 200 map sheets, and linework interpretations from a similar number of satellite images, have been incorporated in the topographic database.

See also:

E-47564 E-47671 F-47439 F-48015 F-48016 F-48180 F-48189
F-48386 F-48648 F-48650 F-48651 F-48652 F-48653 F-48654
F-48789 F-48829 F-48979 F-48985 F-48986 F-48994 F-49077
F-49078 F-49215 F-49222 F-49298 F-49356 F-49403 F-49404
F-49405 F-49406 F-49407 F-49408 F-49409 F-49410 F-49411
F-49412 F-49414 F-49415 F-49416 F-49417 F-49418 F-49419
F-49420 F-49421 F-49425 F-49426 F-49427 F-49428 F-49429
I-47954 I-48655 I-49041 J-47723 J-48647 L-48542 L-49245

D. EXPEDITIONS

D-47445

Cole, L., **Proposals for the first Australian antarctic expedition: an appraisal and reappraisal of the proposals and efforts of a joint committee formed by two of Melbourne's learned societies during the 1880s**, Monash publications in geography No.39, Melbourne, Monash University, Department of Geography and Environmental Science, 1990, 74p., Refs. p.66-70.

DLC G860.C578

The first official Australasian expedition to the Antarctic departed from Hobart, Tasmania, on Dec. 2, 1911. The expedition was led by Douglas Mawson and financed by State and Commonwealth governments, learned societies, and private sources. Much of the planning for this successful expedition was undertaken by a committee formed for that purpose, of the Australasian Association for the Advancement of Science. Learned societies have a special place in the history of Australian antarctic endeavors. The Antarctic Exploration Committee (A.E.C.) tried unsuccessfully for several years to gain government funding to despatch an expedition. The work of the A.E.C. has in the past been dismissed for having failed to 'aim high enough' with its proposed expedition, and for having planned to defray costs by engaging in commercial activity as well as scientific research and geographical exploration. Primary source material which appears to have escaped analysis has made possible the detailed appraisal, and reappraisal, now offered. (Auth. mod.)

D-47816

Tessensohn, F., **Antarctic Expedition GANOVEX VI: introduction to field results**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.63-72, In English and German. 7 refs.

The Ross Sea area is particularly suitable for investigations on the structure and evolution of the antarctic lithosphere. The present structure of the lithosphere is largely characterized by the existence of a large continental rift, a feature that allows the study of the initial processes of lithospheric thinning associated with continental split and break-up. This stage is highly relevant for the later formation of a new ocean. The Ross Sea rift system which is active within an apparently stable and aseismic plate is comparable in size to the Basin and Range province of North America and the East African rift. For an intracontinental system it is unique for the asymmetry of the shoulder uplift. The evolution of the West Antarctic lithosphere to its present stage is characterized by: a) the generation of new crust at the active Gondwana margin bordering the Pacific or its predecessor, and b) the fragmentation of the lithosphere which finally led to the present mosaic of crustal blocks. Both processes can be studied well in the working area.

D-48170

Lee, B.Y., Kim, D.Y., **Report on the summer expedition (1991/1992) of the 5th Korea Antarctic Research Program**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.111-121, In Korean with English summary.

Summer research activities of the 5th Korea Antarctic Research Program were carried out around King Sejong Station and in the Bransfield and Gerlache straits, the Weddell Sea and the Antarctic Peninsula between Dec. 31, 1991, and Feb. 4, 1992. The principal research consisted of an oceanographic survey and terrestrial field research, and covered geology, geophysics, oceanography, biology

and meteorology. Particulars of the expedition, such as number of participants and information concerning the ship *Erebus* used in the oceanographic survey, are given.

D-48228

Rakusa-Suszczewski, S., **Report on the antarctic expedition of the r/v *Professor Siedlecki* to the sea-ice zone, 1988-1989**, *Polish polar research*, 1991 12(4), p.485-494, 2 refs.

The expedition was organized by the Institute of Ecology, Polish Academy of Sciences. Its purpose was to research the zone ahead of the pack-ice in the northern region of the Weddell Sea between Elephant I. and the South Orkney Is. The research was conducted on a meso-scale, continuing the studies begun earlier further to the west. The region studied and the period of study complemented the EPOS research program. A brief outline of Expedition details is provided, including personnel on the scientific team, schedule/calendar, map of the voyage from Elephant I. to the South Orkneys, and a list of sampling stations. (Auth. mod.)

D-48801

Lutjeharms, J.R.E., Lucas, M.I., SANARP Team, **Autumn cruise to Antarctica**, *South African journal of science*, Feb. 1993 89(2), p.60.

One of the least studied features between Africa and Antarctica is the Antarctic Slope Front separating antarctic shelf waters from the open ocean. The ASF is instrumental in the process of forming bottom water and extends from the surface to the sea floor. In March 1992, a German expedition set out in RV *Polarstern* to examine this area during the austral autumnal period. Areas for investigation include physics, chemistry, biota, and their respective processes as the winter ice was forming. It is expected to take a number of years to calibrate and review this data before the results can be published.

D-48852

Spindler, M., ed, Dieckmann, G.S., ed, Thomas, D., ed, **Expedition ANTARKTIS X3 of RV *Polarstern* in 1992** [Die Expedition ANTARKTIS X/3 mit FS *Polarstern* 1992], *Berichte zur Polarforschung*, 1993 No.121, p.1-122, With German summary.

The third leg (ANT X/3) began on Mar. 27, 1992 in Cape Town and ended on May 19, 1992. Interest focussed on seasonal changes in physical, chemical and biological processes in the region of pack ice formation. Investigations concentrated on sea ice biology, plankton in upper water layers, and oceanography. The major goal was to obtain a comprehensive picture of processes prior to, during and after the onset of sea ice formation. To achieve this, *Polarstern* cruised on several transects from open water into the ice and out again. This cruise track also provided the oceanographers with a detailed station grid to study water mass boundaries in the continental area of the Weddell Sea. Additional research was undertaken on deep-sea benthos, microbiology, and fish physiology. During the cruise several long-term moorings were recovered and redeployed. (Auth.)

D-48885

La Grange, J.J., **Beginning: 1. Taking part in the Trans-Antarctic Expedition**, *South African journal of antarctic research*, 1991 21(2), p.92-96, 13 refs.

The account of the Trans-Antarctic Expedition (TAE) of 1955 to 1958 has already been told in several publications. The scientific re-

sults have been published in a series of 16 scientific reports. South Africa's participation in the expedition consisted partly of the assignment of Hannes la Grange from the SA Weather Bureau. This article includes a few incidents, possibly presented a little more on a personal note of his own participation. (Auth. mod.)

D-48886

La Grange, J.J., **Beginning: 2. The first South African national antarctic expedition, 1959-60**, *South African journal of antarctic research*, 1991 21(2), p.98-106, 17 refs.

This is not the full account of the first SANAE (South African National Antarctic Expedition), but a summary of some of the events which formed the foundation for later South African expeditions to Antarctica. The SANAE departed on Dec. 3, 1959 and seven days later encountered the first pack-ice. Heavy ice conditions made progress difficult, and for days on end impossible. The expedition arrived at its destination on Jan. 8, 1960. The site for the future base of South Africa's succeeding expeditions was selected. After the winter several sledge journeys were undertaken in various directions, the longest being by dog sledge to the southern mountains and nunataks covering 561 km in 38 days. (Auth. mod.)

D-49032

Italy, National Scientific Commission for Antarctica, **Straits of Magellan Oceanic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography**, Genova, 1991, 193p., For individual reports see B-49036 through B-49038 and J-49033 through J-49035.

The cruise was based on the premise that oceanographic characteristics found in the Strait of Magellan serve also as indicators of what could be expected further south in those waters that lie between Tierra del Fuego and Antarctica. The six reports provided in this collection cover physical oceanography; dissolved oxygen and nutrients; photosynthetic pigments; primary production; particulate matter; and phytopigment analysis. The data stations are located and raw data are listed.

D-49155

Uranov, E.N., **37th Soviet Antarctic Expedition (SAE)**, *Poliarnye novosti*, Jan. 1992 No.1, p.51-53, Translated from Russian.

The author presents an overview of some of the changes in the expedition's research work (in contrast with previous expeditions) due to a lack of finances. The multidisciplinary investigations are to be conducted at Bellingshausen, Mirnyy, Molodezhnaya, Novolazarevskaya, and Vostok stations, as well as Bunger Hills.

See also:

G-47447 G-49474 K-49264 L-47674

E. GEOLOGICAL SCIENCES

E-45767

Askin, R.A., **Eocene terrestrial palynology of Seymour Island**, *Antarctic journal of the United States*, 1991 27(5), p.44-46, 8 refs.

Terrestrial palynofloras preserved on Seymour I. reflect a shift to *Nothofagus*-dominated vegetation during the early Eocene in the northern Antarctic Peninsula region. Besides *Nothofagus* and conifers, the Seymour I. Eocene floras are rich in Proteaceae, similar to the Campanian to Paleocene succession. Many of the proteaceous species, and other angiosperm species that evolved during the late Cretaceous, continued through into the Eocene; however, a variety of angiosperm taxa make their first appearances in the Eocene. In this epoch, the last land connections between Antarctica and South America were probably severed. Active immigration or emigration to or from Antarctica would still be possible during the Eocene for species with relatively rapid dispersal capabilities, but only during low sea-level stands, although dispersal might also be possible for species whose seeds could survive oceanic (or bird) transport. Mapping of occurrences of plant taxa on Seymour I., South Shetland Is., and southern South America may help elucidate the Paleogene paleogeography of this region, especially scrutiny of taxa such as *Nothofagus* that probably would have required continuous land connections over a relatively long time for dispersal.

E-46768

Keller, R.A., **Geological fieldwork on Deception Island and King George Island, South Shetland Islands**, *Antarctic journal of the United States*, 1991 27(5), p.46, 4 refs.

Volcanic rocks were collected at Deception I. and at the Lion's Rump on King George I. These will be examined and analyses made for petrological and geochemical characteristics.

E-47379

Kallemeyn, G.W., Rubin, A.E., Wasson, J.T., **Compositional classification of chondrites: V. The Karoonda (CK) group of carbonaceous chondrites**, *Geochimica et cosmochimica acta*, Mar. 1991 55(3), p.881-892, 52 refs.

Petrographic and bulk compositional data reveal the existence of a new group of carbonaceous chondrites consisting of the observed fall, Karoonda, one large find from Maralinga, Australia, and 6-11 small finds from five sites in Antarctica. Ningqiang, also a fall, is genetically related to the group. Compositional, textural, and O-isotope data show that the new group is closely related to CV and CO chondrites. In keeping with the practice of naming carbonaceous chondrite groups after a prominent member, it is designated the Karoonda or CK group. All normal CK members are metamorphosed; petrographic grades range from 4 to 6. Some contain shock veins and all exhibit various degrees of blackening due to the dispersion of fine particles of sulfides and magnetite in silicates. Only one other group (EL) has no unequilibrated members. The unequilibrated Ningqiang chondrite is more similar to CK than to CV or CO chondrites, but differs significantly (e.g., low refractory lithophiles, high Mn and Na) in detailed composition. Although precise probability calculations are difficult because of uncertainties regarding pairing, and because so few samples are known, the exceptional abundance of CK chondrites in Antarctica requires an explanation. The authors suggest that compared to other groups, such as CO or CV, the fragmentation of the CK

parent object(s) produced a substantially larger proportion of small meteoroids. Antarctic meteorites involved in this study are: ALH82135, 84038, 85002, EET83311, 87507, 87860, LEW87009, 87214, 86258, Y6903, and 82104. (Auth. mod.)

E-47380

Eugster, O., Michel, T., Niedermann, S., **Pu-244-Xe formation and gas retention age, exposure history, and terrestrial ages of angrites LEW86010 and LEW87051: comparison with Angra dos Reis**, *Geochimica et cosmochimica acta*, Oct.1991 55(10), p.2957-2964, 40 refs.

Reported here are the noble gas isotopic abundances in the two angrites LEW86010 and LEW87051. LEW86010 formed contemporaneously with Angra dos Reis, for which previous analyses yielded a formation age of 4550 Ma. The U/Th He-4 age (3700 Ma) of LEW86010 is higher than the K/AR-40 gas retention age, a feature observed earlier for Angra dos Reis. LEW87051 shows the lowest nominal U/Th He-4 gas retention age (4 Ma) yet observed for a stone meteorite. Details are provided of the calculations for atomic ratios, fission Xe retention age, U/Th He-4 age, and cosmic ray exposure histories. (Auth. mod.)

E-47383

Young, G.C., **Antiarchs (Placoderm fishes) from the Devonian Aztec siltstone, southern Victoria Land, Antarctica**, *Palaeontographica, Abt. A*, June 1988 202(1-4), p.1-125, With German summary. Refs. p.116-119.

An extensive collection of antiarch material from 17 localities in the Aztec Siltstone from Antarctica is described and figured, with a revision of all previously described material. A species of asterolepidoid, *Pambulaspis antarctica* sp. nov., is represented by two specimens. All remaining material is referred to the bothriolepidoid genus *Bothriolepis* Eichwald. *Bothriolepis antarctica* Woodward 1921 is restricted to the lectotype designated by White (1968), and all other antiarch specimens described by White are regarded as indeterminate remains of *Bothriolepis*. Nine transverse lateral grooves are observed in these antarctic species. For antarctic species primary biogeographic affinity is indicated with Australia and South China. A biostratigraphic scheme is proposed for the Aztec Siltstone vertebrate fauna with six zones based on the occurrence of *Bothriolepis* species in association with thelodont scales in the lowest zone, and phyllolepid placoderms in the highest zone. The Aztec sequence is the only one so far known which shows this faunal transition. Revised correlations using the vertebrate zonation are presented for eleven measured stratigraphic sections through the Aztec Siltstone. Localities north of Mount Crean apparently contain only the lowest fossiliferous zone. The entire Aztec succession is considered older than all post-Emsian fish faunas currently known from southeastern Australia, with the exception of the Hatchery Creek fauna. A younger age limit of early Frasnian is suggested for the top of the Aztec succession, but an age as old as early Givetian (late Middle Devonian) cannot be excluded. (Auth. mod.)

E-47418

Campbell, I.B., Claridge, G.G.C., **Soils of cold climate regions**, Weathering, soils & paleosols. Edited by I.P. Martini and W. Chesworth, Developments in Earth Surface Processes. No.2, Amsterdam, Netherlands, Elsevier Science Publishers, 1992, p.183-201, 30 refs.

DLC QE570.W43 1991

The world's coldest climates are found in the north and south polar lands and within these regions temperature has the greatest influence on weathering and soil development. The arctic and antarctic regions are frigid because they receive little solar radiation owing to their high latitude. In the atmosphere, low humidity and precipitation are a consequence of the cold while significant amounts of fluid water are present in the soils only for short periods during warm months. Thus, water is largely unavailable for weathering and translocation of the weathering products. With increasing latitude, chemical weathering, which is the dominant weathering process in tropical and temperate regions, declines in importance, while physical processes become much more important in soil formation. The soils of cold climate regions differ therefore in many ways from those of temperate regions of the earth. This paper examines processes of weathering and soil formation in such cold regions. (Auth. mod.)

E-47420

Meyer-Berthaud, B., Taylor, E.L., Taylor, T.N., **Reconstructing the Gondwana seed fern *Dicroidium*: Evidence from the Triassic of Antarctica**, *Geobios*, 1992 No.25(3), p.341-344, With French summary. 17 refs.

The discovery in antarctic rocks of the Middle Triassic of leaves with *Dicroidium* anatomy attached to stems with undivided vascular cylinder and pycnoxylic wood of the widespread *Dadoxylon* type, calls into question the long-accepted reconstruction of *Dicroidium* fronds attached to *Rhexoxylon* stems. Although *Dicroidium* leaves are common throughout Gondwana, *Rhexoxylon* is known only from Western Gondwana (Argentina, Brazil and South Africa). The anatomy of the antarctic axes, including the presence of numerous buds, suggests a plant with more complex architecture than that proposed in the reconstruction of *Dicroidium* in Western Gondwana. Two hypotheses for the belated discovery of this additional "*Dicroidium* plant" are proposed. (Auth.)

E-47421

Delevoryas, T., Taylor, T.N., Taylor, E.L., **Marattialean fern from the Triassic of Antarctica**, *Review of palaeobotany and palynology*, 1992 Vol.74, p.101-107, 24 refs.

The marattialean fern *Scolecopteris antarctica* sp. nov. is described from early Middle Triassic silicified peat collected in Antarctica. The synangia are radial and borne on pectopterid-type pinnules; spores appear to be alete. This is the first report of the genus in Mesozoic sediments, and suggests that modern marattialeans may not have been related to the Paleozoic forms. (Auth.)

E-47426

Cheng, X.H., Xia, W.P., Zhang, H.S., Zhang, P., **Remobilization and accumulation of iodine in sediments, western antarctic ocean**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.1-9, In Chinese with English summary. 11 refs.

Remobilization and accumulation mechanisms of iodine in different environments of sediments are studied. The results show that iodine is characteristically rich in the organic fractions of bay surface and pelagic sediments. However, it may be associated with oxyhydroxide and adsorptive phases in a higher percentage at the continental shelf and hemipelagic sediments. The environmental character of remobilization of iodine in surficial sediments is similar to that of iron, that is, it is remobilized in reducing condition and converted into solid phases when it is in oxidizing condition, though the iodine does not act as the electron acceptor. The processes of adsorption and oxidation are responsible for the value of I/Corg. in excess of that of planktonic materials, except for the organic fraction in surficial sediments. It is the comprehensive effects of organism decomposition, oxyhydroxide reduction, particulate adsorption and

pore water diffusion which cause decrease of the ratio of iodine to organic carbon with the increase of the depth in sedimentary column. The diffusive and depositive fluxes of the iodine are in the same magnitude, which could be the cause for the poor iodine contents of sedimentary rocks. Based on the calculation and discussion a new model for the remobilization and accumulation of iodine in the sediments is set up. (Auth.)

E-47427

Fu, Y.L., Zhao, Y., Wang, Y.B., **Ar-40/Ar-39 isotopic dating of the syenogranite and granite pegmatite in the Zhongshan Station, East Antarctica**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.10-17, In Chinese with English summary. 8 refs.

The Larsemann Hills consist mainly of gneisses, which underwent low pressure granulite facies metamorphism, with minor undeformed granites. The syenogranite in the Larsemann Hills is derived from late partial melting. Although in Broknes Peninsula a dyke of this granite crosscuts gneisses, in northern Mirror Peninsula the syenogranite is transitional to less foliated gneisses. The biotite samples from the syenogranite (12520), and a granite-pegmatite (13101) which has intruded the syenogranite, are unaltered. The method and instruments used to study the samples are described. Incremental heating experiments were performed on the mass spectrometer MM-1200, where argon isotope was analyzed in static. The authors measured sample biotite 12520 and biotite 13101 with the Ar-40/Ar-39 technique. Results of the experiments yield an Ar-40/Ar-39 age spectrum, which is approximately a line, and yield a plateau age = 485.84 ± 0.58 Ma, isochron age = 486.34 ± 4.31 Ma, and total age = 486.08 ± 1.17 Ma for sample biotite 13101; and yield a plateau age = 494.39 ± 1.26 Ma, isochron age = 495.38 ± 4.63 Ma, total age = 491.05 ± 10.36 Ma for sample biotite 12520. The plateau ages may be considered as the late stage of a Pan-African thermal event. (Auth. mod.)

E-47428

Shen, Y.B., **Discussion on stratigraphic subdivision and nomenclature in Fildes Peninsula, King George Island, Antarctica**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.18-26, In Chinese with English summary. 18 refs.

The Fildes Peninsula contains subalkaline volcanic rocks and a rich flora-bearing pyroclastic-sedimentary sequence which was named the Fildes Peninsula Group (FPG) (Hawkes, 1961; Barton, 1965; Birkenmajer, 1982; Li *et al.*, 1989). FPG is divided into five formations and an abnormal lithostratigraphic unit based on differences in lithologic, biotic and volcanic characteristics. Descriptions and definitions are provided for the Upper Cretaceous Half Three Point Formation, the Paleocene strata, the Eocene strata, and the Miocene volcanic rocks. (Auth. mod.)

E-47444

Trull, T.W., Kurz, M.D., Jenkins, W.J., **Diffusion of cosmogenic He-3 in olivine and quartz: implications for surface exposure dating**, *Earth and planetary science letters*, Apr. 1991 103(1/4), p.241-256, 57 refs.

The *in situ* production of He-3 in surface rocks by cosmic ray-induced nuclear reactions offers an important geochronological tool. To evaluate helium loss problems in this technique, cosmogenic He-3 diffusivities were measured in quartz and olivine by incremental heating at 150-600 C. Arrhenius temperature dependences were observed in both minerals with similar activation energies and imply very low diffusivities when extrapolated to environmental temperatures. Cosmogenic He-3 diffuses more than 100 times faster than trapped magmatic He-3 in olivine or radiogenic He-4 in quartz. It is possible that helium diffusivities may depend on a sample's cosmic ray exposure or radiogenic production history. Whatever the precise mechanism, the higher mobility of He-3 suggests that incremental

heating will be useful in separating cosmogenic helium from magmatic or radiogenic helium in future studies. Comparison of the diffusivity results with total cosmogenic He-3 contents of different quartz size fractions for an antarctic quartzite suggests that He loss may have occurred more rapidly than predicted by laboratory measurements. Nonetheless, retention of cosmogenic He-3 is quite high (equivalent to more than a million years of exposure), and cosmogenic He-3 geochronology is feasible in this and other quartz-containing rocks.

E-47482

Dorn, R.I., **Manganese-rich rock varnish does occur in Antarctica**, *Chemical geology*, Sep. 15, 1992 99(4), p.289-298, Refs. p.297-298.

Despite accounts to the contrary, the authors have found that Mn-rich rock varnish is present in Antarctica, as others have before. It is chemically and texturally similar to many varnishes found in lower latitudes. Antarctic varnishes show considerable potential as a dating and paleoenvironmental research tool. (Auth.)

E-47483

Tribaudino, M., Talarico, F., **Orthopyroxenes from granulite rocks of the Wilson Terrane (Victoria Land, Antarctica): crystal chemistry and cooling history**, *European journal of mineralogy*, May, June 1992 4(3), p.453-463, 30 refs.

The compositions of 17 orthopyroxenes from granulites facies rocks of the Wilson Terrane (Ross Orogen), determined by microprobe analysis, are consistent with a metamorphic origin. Three groups may be distinguished: orthopyroxenes with high Al₂O₃ content (2.85-5.33 weight%) and XMg=0.46-0.60, from garnet-cordierite granulites; orthopyroxenes with low Al₂O₃ (less than 0.9 wt%) and XMg=0.49-0.62, from enderbites; and orthopyroxenes with very low Al₂O₃ (less than 0.4 wt%) and XMg=0.70, from two-pyroxene mafic granulites. These differences do not reflect metamorphic conditions, but are due to local mineral assemblages. Zoning occurs in few orthopyroxenes from garnet-cordierite and mafic granulites, in both cases due to a retrograde evolution. The crystal chemistry and site populations of two Al-rich and one Al-poor specimen were determined by X-ray single crystal diffraction. The most relevant structural differences are the decrease in M1 and M2 polyhedral dimensions, and an increase in TB, both induced by Al. The high degree of Fe²⁺ -Mg order (kD between 0.017 and 0.023) is coherent with slow cooling. Closure temperatures of the ordering process are between 214 and 243 C, with cooling rates in the range expected for a regional metamorphic terrane. (Auth.)

E-47484

Brotzu, P., **Geochronology and geochemistry of Ferrar rocks from north Victoria Land, Antarctica**, *European journal of mineralogy*, May, June 1992 4(3), p.605-617, Refs. p.615-617.

K-Ar determinations on two igneous units from north Victoria Land, representative of the Ferrar Dolerite and Kirkpatrick Basalt, yield dates ranging from 144 to 180 Ma. The oldest date is in agreement with a Rb-Sr isochron age of 182 Ma provided by most of the analyzed samples. It is considered to represent the age of the magmatic activity which produced the two suites; younger dates are attributed to argon loss subsequent to cooling. The chemical compositions of the rocks range from basaltic andesite to dacite. Major-element mass balance, trace element modelling, isotopic and geothermometric data, all imply a closed-system differentiation history from basaltic andesite to dacite. The normalized trace element contents of the least evolved basaltic andesite studied are intermediate between those of low-TiO₂ and high-TiO₂ lavas from the Mesa Range to the south. Major and trace element modelling show that the studied basaltic andesites can be derived by crystal fractionation processes from the least differentiated low-TiO₂ rocks,

and in turn may generate high-TiO₂ rocks by crystal fractionation. (Auth. mod.)

E-47491

Joshi, A., Pant, N.C., Parimoo, M.L., **Granites of Petermann Ranges, East Antarctica and implications on their genesis**, *Geological Society of India. Journal*, Aug. 1991 38(2), p.169-181, Refs. p.179-181.

The hypersolvus granitic rocks of the Petermann Ranges in East Antarctica reveal high alkali content, generation from a relatively dry magma as shown by the field and petrological characters, and development in an anorogenic setting as indicated by an indirect genetic linkage with the spatially associated Gruber anorthosite massif. Hence, their resemblance to A-type granites and generation in a tensional tectonic environment is suggested. The petrochemical characters indicate that the partial melting of a heterogeneous but largely metasedimentary source generated the melt for crystallization of the Petermann granite. The heat required for melting was possibly released by the fractionating basic magma which produced the juxtaposed Gruber anorthosite massif. (Auth.)

E-47509

Taylor, T.N., Taylor, E.L., **Permian plants from the Ellsworth Mountains, West Antarctica**, Geological Society of America. Memoir 170, Boulder, Geological Society of America, 1992, p.285-294, 36 refs.

Plant megafossils are described and illustrated from several localities and stratigraphic levels within the Ellsworth Mountains. The flora is dominated by various species of *Glossopteris* foliage and also includes sphenophyte stems and leaf sheaths, glossopterid reproductive organs, *Gangamopteris* leaves, and *Vertebraria*-type axes. The plants are preserved as impressions in fine-grained shale within the Polarstar Formation. Based on comparisons with other antarctic and Gondwana floras, a Middle to Late Permian age is suggested. (Auth.)

E-47523

Zhao, J.L., **Characteristics of the modern environmental geochemistry and natural environmental evolution in the region of antarctic Great Wall Station**, Beijing, Science Press, 1991, 178p., In Chinese with abridged English version. Refs. p.100-106.

The geochemistry in the region of the Great Wall Station on the Fildes Peninsula of King George Island is described. Variations in the chemical element content of the rock, soil, atmospheric aerosol, lake water, and lake bottom sediment, particularly the Ca content in the sediment of West Lake over the last 16,000 years, are indicators of the variations in temperature and precipitation over the same period. Comparative studies with southern Chile may indicate shifts in the Antarctic Convergence and comparative studies with China may indicate a relationship with north-south shifts in the climate zones of eastern China, glacier activity in the western mountains of China, and sea level rise and fall in eastern China. It is suggested that geochemical variation at the Great Wall Station be monitored as a possible indicator of global change.

E-47548

Elliot, D.H., Darrah, M., **Beardmore Project, 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.1-2, 3 refs.

A description is given of 1990-1991 activities at Beardmore Base Camp. In addition to the science activities, summaries are given of the logistics that went into the setting up and operating of the base camp; helicopter operations for moving 29 scientists involved in eight projects and their equipment to and from McMurdo Station and to various field camps during this two-months investigative program.

The science effort concentrated on aspects of the Gondwana sequence, structural evolution of the Transantarctic Mountains, and Late Cenozoic paleoclimate. Field investigations resulted in the acquisition of much new data, and a number of significant paleontological discoveries were made at several sites within about 50-60 km of the Beardmore Base Camp.

E-47549

Elliot, D.H., Fleming, T.H., Miller, C.A., Hanson, R.E., **Mesozoic volcanic rocks in the Queen Alexandra Range, Antarctica** *journal of the United States*, 1991 26(5), p.3-4, 4 refs.

The primary objectives for the field program in the Queen Alexandra Range, central Transantarctic Mountains, were to investigate the paleovolcanology of the silicic and basaltic pyroclastic rocks and lavas in the upper Falla Formation, the Prebble Formation, and the Kirkpatrick Basalt; to establish the tectonic setting in which these volcanic rocks were erupted; and to collect samples of basalts and associated secondary minerals for chemical and isotopic analysis. Specific areas studied were Mount Kirkpatrick, Mount Falla, and Tempest, Kenyon, Storm, and Lindsay Peaks. Details of the structure and characteristics of the surveyed area and of the materials collected are given.

E-47550

Goodge, J.W., Hansen, V.L., Walker, N.W., **Geologic relations of the upper Nimrod Glacier region, central Transantarctic Mountains: evidence for multiple orogenic history**, *Antarctic journal of the United States*, 1991 26(5), p.4-6, 5 refs.

Geologic field work was conducted in the Nimrod Glacier region of the central Transantarctic Mountains during 1990-1991, to continue study of basement metamorphic rocks of the Precambrian Nimrod Group. The field party operated from a base camp in the southern Miller Range. The group also conducted brief operations in the upper Nimrod Glacier area with support from a ski-equipped Dornier 228 aircraft, provided in cooperation with the German GANOVEX-VI program, to investigate structural relations within rocks of the Beardmore Group. The principal goal of the project is to improve understanding of the tectonic evolution of the high-grade basement complex with respect to development of the east antarctic cratonal margin. Work this season focused on field relations between various lithotectonic units, documentation of mega- and mesoscopic structures, and collection of samples for petrologic study, thermobarometric analysis, kinematic and fabric analysis, and uranium-lead geochronometric investigation.

E-47551

Horner, T.C., Krissek, L.A., **Permian and Triassic paleosols from the Beardmore Glacier region, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.7-8, 4 refs.

The study of fossil soils provides information about ancient climates and general environmental conditions during deposition of ancient rock units. To gain such information, Permian and Triassic paleosols (fossil soil horizons) were identified, described, and collected from outcrops in the Beardmore Glacier region. The units examined in this study include the Permian Buckley Formation and the Triassic Fremouw Formation. Paleosols observed in the Beardmore Glacier area are relatively well exposed but poorly developed. Widespread lateral and vertical exposures within single extensive outcrops hold excellent promise for further detailed study of lateral and temporal variation in paleosol development. The poor development of Permian and Triassic soils is probably due to rapid sediment supply and also may have been influenced by the type of vegetation present or the depth to the water table.

E-47552

Wilson, T.J., **Jurassic fault and dike patterns in the Beardmore Glacier area, central Transantarctic Mountains**, *Antarctic journal of the United States*, 1991 26(5), p.9-12, 13 refs.

The field party in this Beardmore Glacier study deployed to the Beardmore South Camp on Nov. 19, 1990. One month was spent examining localities in the Queen Alexandra Range at Montgomery Glacier, Tillite Glacier, and around Prebble Glacier, in the Colbert Hills at Coalsack Bluff and Mount Sirius, and in the Painted Cliffs at Dawson Peak and Mount Picciotto. The following month consisted of field work. Helicopter support made it possible to document the orientation patterns of faults and dolerite dikes along an approximately 225 km transect across the Transantarctic Mountains and to visit many otherwise inaccessible exposures around the Beardmore Glacier. Thin Ferrar dolerite dikes cutting Beacon strata are common in the Beardmore region, but are widely scattered throughout the area and do not form closely spaced dike swarms. The dikes are typically 20-300 cm thick and have a minimum total strike continuity of tens to hundreds of meters. In detail, individual dikes consist of a series of *en echelon* segments. The Jurassic structural trends in the Beardmore Glacier area are nearly identical to the Jurassic trends documented previously in southern Victoria Land (Wilson 1990), demonstrating a regionally consistent pattern of extensional strain during Ferrar magmatism.

E-47553

Isbell, J.L., Macdonald, D.I.M., **Alluvial stratigraphic sequences within the Permian Transantarctic foreland basin, Beardmore Glacier area, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.13-14, 9 refs.

During the austral summer of 1990-1991, data were collected from exposures of the Permian Buckley Formation in the Beardmore Glacier region at Clarkson Peak, Mount Picciotto, Mount Acherar, Mount Bowers, and Willey Point. Data consist of detailed vertical logs, maps of lithofacies and sediment-body geometries, and paleocurrent orientations. Extensive photo mosaics were taken from helicopter fly-bys at these and at numerous other sites. These photos aided in the three-dimensional reconstruction of sedimentary bodies and stratigraphic packages. Sedimentologic and stratigraphic analyses of the Buckley Formation in the Beardmore Glacier region support the hypothesis that the Permian strata were deposited within a foreland basin associated with the Gondwanide orogeny. Results suggest that tectonic loading along the paleo-Pacific margin of Antarctica controlled basin formation and sediment deposition.

E-47554

Isbell, J.L., Macdonald, D.I.M., **Lithofacies analysis of the Triassic Fremouw Formation at the Gordon Valley vertebrate site, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.15-16, 8 refs.

During the austral summer of 1990-1991, the Triassic Fremouw Formation at the Gordon Valley vertebrate sites in the Queen Alexandra Range was examined. The main task of this work was to place the fossiliferous horizons into a sedimentological context. The vertebrate sites are located along the north side of Gordon Valley. Exposed rocks consist of the middle (90 m) and upper (80 m) members of the Fremouw Formation and thin dolerite sills of the Jurassic Ferrar Group. The middle Fremouw member contains a vertebrate trackway, and the vertebrate bone-bearing beds occur in the upper Fremouw member. The upper member of the Fremouw Formation is predominantly a very coarse-to-pebbly granular-grained quartzose sandstone 7 to 20 m thick. The main vertebrate bone-bearing bed lies at 161 m above the base of the section and is contained within a multi-storied sandstone containing three amalgamated erosional-based sandstone bodies. The bone bed is a matrix-supported intraclast conglomerate, 0 to 1 m thick. Conglomerate clasts consist of

rounded siltstone blocks. Vertebrate bones are contained within the sandstone matrix of the conglomerate.

E-47555

Krissek, L.A., Horner, T.C., **Sedimentology of a vertebrate bone-bearing bed in the Triassic Fremouw Formation at Gordon Valley, Beardmore Glacier region, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), P.17-19, 12 refs.

At several localities in the central Transantarctic Mountains, the lower Fremouw Formation has yielded vertebrate fossils of the *Lystrosaurus* biostratigraphic zone. Late in the 1985-1986 field season, however, an additional bone-bearing horizon was discovered in the basal portion of the upper Fremouw Formation at Gordon Valley; specimens recovered from that horizon were subsequently identified as characteristic of the late Early Triassic *Cynognathus* zone or slightly younger. The composition, fabric, texture, and sheet-form geometry of the bone-bearing conglomerate, the characteristics of its basal contact, and the absence of preferred orientation of its elongate clasts all indicate rapid deposition by a large, unchannelized, high viscosity, low-to-moderate velocity flow, i.e., a relatively fluid debris flow. This large flow spread laterally from an unidentified large channel across a floodplain that contained low-relief channels, transporting bones, wood, and clasts of floodplain siltstones from further upstream. This multistage transport history would account for the mixed nature of the vertebrate fauna described in 1988.

E-47556

Hammer, W.R., Hickerson, W.J., Krippner, S., Tamplin, J., **Therapsids, temnospondyls, and dinosaurs from the Fremouw and Falla Formations, Beardmore Glacier region, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.19-20, 6 refs.

The Falla Formation vertebrates were first discovered late in Dec. 1990. The fossils were mainly concentrated in one small area of siltstone exposure on Mount Kirkpatrick at about 4,500 m above sea level. Of the over 50 bones collected, only 3 were not from this single concentration. The bones are very well preserved, large, and include much of the skeleton of one dinosaur, and perhaps portions of a second. At least one of the three isolated postcranial bones is from yet another smaller animal. A "Megalosaurus" type theropod tooth was found among the initial bones removed. Since most of the fossils are still largely encased in rock, the number and type of animals represented is not entirely certain at this point. From what can be seen, however, it is apparent that the collection contains at least the top portion of a skull, over 20 vertebrae, numerous ribs, portions of at least eight limb bones including a humerus and part of femur, one side of a shoulder girdle, part of a pelvis and a number of pes elements. In total, over 1,800 kg of fossil-bearing rock was removed from the site.

E-47557

Macdonald, D.I.M., Isbell, J.L., Hammer, W.R., **Vertebrate trackways from the Triassic Fremouw Formation, Queen Alexandra Range, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.20-22, 7 refs.

During the 1990-1991 field season, a party of geologists from the British Antarctic Survey, Ohio State University, and Augustana College discovered a Triassic vertebrate trackway in the Gordon Valley area of the Queen Alexandra Range. The trackway horizon occurs in a 167 m thick section of the middle and upper (basal part) members of the Fremouw Formation exposed along the north side of Gordon Valley. The trackways are at a stratigraphic height of 67 m in the middle Fremouw member. They occur on the top surface of a 65 cm thick composite bed, which appears to be a silicified paleosol. The upper part of the bed comprises a 10 cm massive layer with rootlets,

overlain by a rubbly, nodular unit, which is in turn overlain by 2 cm of stylolitized chert, 5 cm of structureless siliceous mudstone, and 1 cm of laminated siliceous mudstone. These sedimentary rocks resemble a soil profile which could either be a silicified calcrete or an unusual type of silcrete. The structureless and laminated units at the top of the profile were probably deposited in an ephemeral lake. The tracks occur on the top surface of the laminated unit. They depress the bedding plane by 0.1-0.5 cm. Three different types are recognized.

E-47558

Taylor, E.L., Cùneo, R., Taylor, T.N., **Permian and Triassic fossil forests from the central Transantarctic Mountains**, *Antarctic journal of the United States*, 1991 26(5), p.23-24, 6 refs.

During the 1990-1991 field season, two fossil forests were studied and wood specimens collected in the vicinity of the Beardmore Glacier. Both forests include silica permineralizations of trunks preserved in growth position; the stands were analyzed using the point-quarter centered method. The Permian forest occurs on Mount Achnar within the Upper Buckley Formation. The site is about 20x12 m in size and includes 15 rooted stumps. These range from 9 to 18 cm in diameter; the tallest specimen is approximately 20 cm in height, possibly reaching 5-6 m in life. The stumps are separated 1.95 m on average, suggesting a very dense forest. Distinct growth rings are present. The second forest occurs in the upper Gordon Valley, near Mount Falla. This site is within the upper part of the Fremouw Formation and is believed to be Middle Triassic in age. There are many more rooted stumps preserved at this site (approximately 100 on two levels) than at the Permian site. The forest covers an area of approximately 128x30.5 m. The trees are also larger than those at Mount Achnar, ranging from 13 to 61 cm in diameter. The tallest trunk is about 60 cm high and probably exceeded 20 m in life. The stumps are separated 6.23 m on average, forming part of a relatively open mature forest.

E-47559

Borg, S.G., DePaolo, D.J., Daly, E.E., Sims, K.W.W., **Studies of granitic and metamorphic rocks, Horlick and Whitmore Mountains area**, *Antarctic journal of the United States*, 1991 26(5), p.24-25, 4 refs.

Geologic mapping and sampling of granitic and metamorphic rocks were carried out in the Horlick Mountains (including the Wisconsin Range, the Ohio Range, Long Hills, Metavolcanic Mountain, and Minna Spur) and the Whitmore Mountains during the 1990-1991 austral summer. This was accomplished with a combination of Twin Otter aircraft support and ground traverses. The investigation focused on the structural aspect of the various units comprising the study area and the comparison of the data with that of other known antarctic areas. Details of the findings are briefly outlined.

E-47560

Mensing, T.M., **High-titanium basalt and dolerite clasts from the Elephant and Reckling moraines**, *Antarctic journal of the United States*, 1991 26(5), p.26-27, 12 refs.

Ten specimens of basalt and dolerite from the Elephant and Reckling moraines were analyzed for major-element concentrations. Two of the samples from the Reckling Moraine have elevated concentrations of titanium oxide (1.10 and 1.42%) compared to an average of 0.70% for the other eight samples. The high-titanium basalts also have elevated concentrations of ferric oxide, silica, and phosphate, whereas their concentrations of aluminum oxide, calcium oxide, and magnesium oxide are anomalously low. These differences in the chemical compositions of basalt and dolerite clasts are the same as the differences in composition reported for two suites of basalt in the Mesa Range in 1991 and 1987. High-titanium dolerite was also reported in 1983 from the Griffin Nunatak, about 40 km northwest of the Reckling Moraine. The presence of high-titanium basalt and dolerite in southern Victoria Land is significant, because similar rocks in

northern Victoria Land contain isotopic and chemical evidence of a thermal overprint of Cretaceous age.

E-47561

Malin, M.C., **Short-term variations in the rate of eolian processes, southern Victoria Land, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.27-29, 4 refs.

Eolian abrasion acts as an important limit on the rate and magnitude of erosion in the antarctic cold desert. The amount of abrasion depends on sediment supply, wind speeds and turbulence, and the heterogeneity of target materials. Earlier reports were based on single-year observations at the 11 test sites scattered throughout the ice-free valleys and transantarctic ranges in southern Victoria Land. On average, a minimum of 67 to 75% of abrasion measured after 5 years occurred during the first year of the study. At some sites and in some directions, all the abrasion (to the ability to measure mass changes) occurred during that single year, while at other locations and in other directions the first year's mass loss was less than the average of the remaining years's mass loss. Despite the philosophical problems inherent in averaging such wildly variable data, it appears on averaging all heights, all directions, and all materials, that an order of magnitude more abrasion occurred during 1984 than in each of the subsequent 4 years. The mass of sediment collected, the susceptibility of the target materials known from both laboratory and field studies, and the magnitude of abrasion also suggest that sediment transport velocities were much higher in 1984 than in the subsequent 4 years.

E-47562

Kurz, M.D., Brook, E.J., Ackert, R.P., Jr., **High-altitude volcanic outcrops in the Kukri Hills, southern Victoria Land**, *Antarctic journal of the United States*, 1991 26(5), p.30-31, 5 refs.

During the 1990-1991 field season, two previously unreported volcanic outcrops were documented. The two locations, referred to informally here as Haskell Ridge and Kukri Cone, have the highest altitude and are among the largest outcrops of volcanic rocks in the McMurdo Dry Valley region. Haskell Ridge is an elongate feature consisting of scoria and lava flows, approximately 500 m in length, and located just west of the Borns Glacier N  v   at approximately 1,920 m elevation. At the center of the ridge is a circular bowl-shaped depression, 130 m in diameter, that is inferred to be a volcanic cone. The rocks are pyroxene and olivine phyric, and contain crustal xenoliths of dolerite and sandstone. Kukri Cone is a distinctive volcanic cone between the Borns and Calkin glaciers, approximately 500 m in diameter, at approximately 2,000 m elevation. Only the northeastern crater rim was visited, which consists of sparsely phyric, brown oxidized scoria and volcanic spatter. Crustal xenoliths also are present within the volcanic rocks. Kukri Cone is the largest volcanic cone among the volcanic deposits of Taylor and Wright Valley. Basement rocks, which are inferred to be glacial erratics based on size, lithology, and surface texture, relative to the observed crustal xenoliths, both overlie and occur within reworked volcanic material at the edges of both outcrops.

E-47563

Wu, B.Q., Berg, J.H., **Geology and chemistry of the Early Paleozoic dike-swarms in southern Victoria Land**, *Antarctic journal of the United States*, 1991 26(5), p.32-33, 2 refs.

Several thousand dikes crop out extensively in the Precambrian and Early Paleozoic metamorphic basement rocks and the granitic plutons of Granite Harbor Intrusives in southern Victoria Land. Field relationships and isotopic ages (440-510 m.y.) of these dikes suggest that the dikes were emplaced in the late stages of the Ross Orogeny. Most of these dikes have northeast strike orientations parallel to the trend of the Transantarctic Mountains, and some others show northwest trends. The dikes are typically 0.5-3 m wide, with

some up to 10 m. These dikes consist of a variety of rock types including lamprophyres, malchites, microdiorites, porphyrites, porphyries, and microgranites. Lamprophyre and malchite dikes are often cut by porphyrite and porphyry dikes.

E-47564

Ten Brink, U.S., Beaudoin, B.C., Stern, T.A., Bannister, S., **Seismic investigation of the boundary between East and West Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.33-36, 2 refs.

Stanford University and the Geology and Geophysics Division of the Department of Scientific and Industrial Research (DSIR) of New Zealand carried out the Seismic Experiment Ross Ice Shelf (SERIS) during austral summer 1990-1991 across the Transantarctic Mountain front at latitudes 82-83S. The experiment included a 134 km seismic reflection profile and a 96 km coincident wide-angle reflection/refraction profile. Gravity and relative elevation (using barometric pressure) were measured along the entire profile. The primary purpose was to image the transition from the rift system to its uplifted shoulder, to gain insight into the processes of crustal rifting and rift-shoulder mountain building. Because it was the first large-scale, modern multichannel seismic experiment in the remote interior of Antarctica, SERIS had a second purpose: to test different seismic acquisition techniques and the logistical support that will be involved in future seismic exploration of the continent. The geological research of Antarctica heavily depends upon seismic and other remote-sensing techniques because of the paucity of rock exposures.

E-47565

Luyendyk, B.P., Richard, S.M., Smith, C.H., Kimbrough, D.L., **Geological and geophysical investigations in the northern Ford Ranges, Marie Byrd Land, West Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.37-40, 16 refs.

The Phillips, Fosdick, and Chester Mountains form one or more south-dipping tilted blocks. The north face of the Fosdick Mountains is defined by spectacular cliffs up to 500 m high. A subhorizontal geomorphic surface seen in the Phillips (Mount Paige) and the eastern Fosdick Mountains may be the Late Cretaceous/Early Tertiary erosion surface described throughout Marie Byrd Land in 1983. Field mapping resulted in revisions to the maps of 1977 and 1978. In the Phillips Mountains, outcrops at 145W are Ford granodiorite, not Byrd Coast granite, and Herrmann Nunatak is Ford granodiorite, not Byrd Coast granite. In the Fosdick Mountains, some outcrops mapped as Fosdick metamorphic rocks in the east are Cenozoic volcanics. A transitional plutonic-metamorphic rock unit (Neptune-Griffiths transitional rocks) has been defined for rocks exposed on Neptune and Griffith Nunataks and on the south side of Mount Richardson. It comprises foliated hornblende-biotite tonalite or granodiorite (Ford granodiorite?) with metamorphic enclaves. It is interpreted to represent the transition between the Fosdick Complex and the Ford granodiorite of the Chester Mountains.

E-47566

Vennum, W.R., Rowley, P.D., Laudon, T.S., **Plutonic rocks of the English Coast and northern Behrendt Mountains, eastern Ellsworth Land, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.41-44, 17 refs.

Plutonic rocks described in this paper have similar geochemical, isotopic, and mineralogical characteristics to I-type granitoids from southeastern Australia, and possess both typical calc-alkaline geochemical trends and a compositional range similar to the high alumina, calc-alkaline, basalt-andesite-rhyolite suite of continental margins. Their modal and normative compositions, petrography, geochemical parameters, isotopic ages and tectonic setting are identical to those of the Lassiter Coast Intrusive Suite, which is exposed east and northeast

of the present study area in the eastern part of Ellsworth Land and along the eastern edge of the southern Antarctic Peninsula. It is concluded, therefore, that the plutonic rocks of the English Coast as well as the previously unstudied plutonic rocks of the northern Behrendt Mountains represent a southward and southwestward extension of the Lassiter Coast Intrusive Suite. It is also concluded that the granitic rocks exposed throughout the entire southern Antarctic Peninsula and eastern Ellsworth Land represent a consanguineous suite of magmas formed in a magmatic arc that developed in response to subduction of the Pacific Ocean plate along the western edge of the southern Antarctic Peninsula.

E-47567

Askin, R.A., **Eocene terrestrial palynology of Seymour Island, Antarctic journal of the United States**, 1991 26(5), p.44-46, 8 refs.

Terrestrial palynofloras preserved on Seymour I. reflect a shift to *Nothofagus*-dominated vegetation during the early Eocene in the northern Antarctic Peninsula region. Besides *Nothofagus* and conifers, the Seymour I. Eocene floras are rich in Proteaceae, similar to the Campanian to Paleocene succession. Many of the proteaceous species, and other angiosperm species that evolved during the late Cretaceous, continued through into the Eocene; however, a variety of angiosperm taxa make their first appearances in the Eocene. In this epoch, the last land connections between Antarctica and South America were probably severed. Active immigration or emigration to or from Antarctica would still be possible during the Eocene for species with relatively rapid dispersal capabilities, but only during low sea-level stands, although dispersal might also be possible for species whose seeds could survive oceanic (or bird) transport. Mapping of occurrences of plant taxa on Seymour I., South Shetland Is., and southern South America may help elucidate the Paleogene paleogeography of this region, especially scrutiny of taxa such as *Nothofagus* that probably would have required continuous land connections over a relatively long time for dispersal.

E-47568

Keller, R.A., **Geological fieldwork on Deception Island and King George Island, South Shetland Islands, Antarctic journal of the United States**, 1991 26(5), p.46, 4 refs.

Volcanic rocks were collected at Deception I. and at the Lion's Rump on King George I. These will be examined and analyses made for petrological and geochemical characteristics.

E-47569

Evans, K.R., Rowell, A.J., Rees, M.N., **Sea-level fluctuations and the evolution of a Middle Cambrian carbonate ramp in the Neptune Range, Antarctic journal of the United States**, 1991 26(5), p.47-49, 7 refs.

Field investigations of the Nelson Limestone during the austral summer of 1989-1990 and subsequent laboratory results document in some detail the first record of relative sea-level changes known from Middle Cambrian rocks along the antarctic sector of Gondwanaland. In three stratigraphic sections in the Neptune Range, one can recognize sequence stratigraphic elements that include a lower sequence boundary, a terrigenous valley-fill succession, and three parasequences. Although the application of sequence stratigraphy toward quantifying global sea-level change remains controversial (Miall, 1986), the implication for nearly synchronous development of bounding surfaces, sequence or parasequence boundaries provides a means for intrabasinal chronostratigraphic correlation of strata. In the Nelson Limestone, these correlations show that the initial carbonate ramp evolved into a rimmed, distally steepened ramp or platform.

E-47570

Grew, E.S., Manton, W.I., Asami, M., Makimoto, H., **Age of charnockitic gneiss from Mount Vechernyaya, Thala Hills, near Molodezhnaya Station, East Antarctica, Antarctic journal of the United States**, 1991 26(5), p.49-51, 4 refs.

This paper concerns the age of a charnockitic gneiss intruded by the orthogneiss in the Thala Hills. Several samples for geochronological studies were collected at Grew's (1978) locality for sample 106Z. In this paper data are reported from one of these samples, number EG880121503 (abbreviated to 1503 in the text). Sample 1503 is yellow-brown and layering is indistinct except for a few biotitic seams. Grain size is mostly 1-2 mm, and it rarely reaches 6 mm. In general, perthitic potassium feldspar is dominant over plagioclase, which locally is myrmekitic. Other major minerals in 1503 are quartz and hypersthene, whereas biotite, garnet, zircon, monazite, apatite, opaque minerals and secondary carbonate are found mostly in trace amounts. Hypersthene is partially replaced by a brownish material. The data on zircons separated from 1503 are highly discordant and are so tightly clustered that no meaningful line can be fitted to them; however, combining the 1503 data with data on 106Z results in a chord with upper and lower intercepts of 1,525 m. y. and 464 m.y., respectively.

E-47573

Kelly, S.R.A., Moncrieff, A.C.M., **Marine molluscan constraints on the age of Cretaceous fossil forests of Alexander Island, Antarctica, Geological magazine**, Nov. 1992 129(6), p.771-778, Refs. p.777-778.

New evidence provided by bracketing marine molluscan faunas suggests a Late Albian age for fossil forests in the upper part of the Fossil Bluff Group of Alexander I. These *in situ* forests are underlain by Late Aptian and Late Albian strata containing faunas including ammonites (the last of which is *Lechites*), inoceramid bivalves, dimitobelid belemnites and trace fossils. The tree-bearing levels occupied a fluvial dominated environment, subject to periodic major floods. They were transgressed during late Albian time by returning marine conditions with diverse faunas, including hamitid and puzosiid ammonites. The increased precision in dating of the fossil forests will improve palaeobotanical contributions to climate and environmental studies.

E-47581

Park, B.K., Jwa, Y.J., **Potassium-argon radiometric ages of volcanic rocks from the Fildes Peninsula, King George Island, Antarctica, Geological Society of Korea. Journal**, Aug. 1991 27(4), p.409-415, In Korean with English summary. 18 refs.

From the K-Ar radiometric age determination, it is concluded that the volcanic rocks on the Fildes Peninsula have ages of 53-61 Ma (Early Tertiary). K-Ar whole-rock ages show 59.5 Ma, 61.4 Ma, 56.2 Ma, 53.2 Ma from the lower to the upper part of the Fildes Group, in general accordance with stratigraphical division. By processing the age data from this study and previous studies, it is recognized that the volcanic activities in the Fildes Peninsula were vigorous during Paleocene-Eocene time, and migrated progressively from south to north and west to east. Tertiary volcanism in western King George I., which began in southern Fildes Peninsula in the late Cretaceous or Early Tertiary period, migrated northward and eastward over time. The eastward migration of the volcanism is observed on the Barton and Potter Peninsulas.

E-47583

Verkulich, S.R., **Morphology and development of sea terraces on the shores of Bunger Hills** [Osobennosti morfologii i formirovaniia morskikh terras na poberezh'iakh zalivov oazisa Bangera (Vostochnaia Antarktida)], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.9-14, In Russian. 4 refs.

Significant geomorphological differences are found between the lower (up to 10 m above sea level) and upper (10-40 m above sea level) sections of the terraces of Bunger Hills shores, particularly regarding the time of their formation and further development. A glacio-morphological map of the area showing the water distribution of Pleistocene and Holocene sea transgressions is presented. A twofold connection is found between the topographic development of Bunger Hills shores and the sea transgressions. It is concluded that the lower section of the terraces was formed by a Mid-Holocene transgression; the upper section was formed considerably earlier, under strictly continental conditions, and doesn't present any visible evidence of marine action.

E-47587

Mart'ianov, V.L., Babintsev, A.V., Pereira, O., Tartaro, L., **Hydrology of Lake Glubokoye, King George I., winter 1987** [Gidrologicheskie raboty na ozere Glubokom na o-ve King-Dzhordzh (Vaterloo) v zimniĭ period 1987 g.], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.27-32, In Russian. 4 refs.

Hydrological investigations of Lake Glubokoye, carried out at Artigas Station by Soviet and Uruguayan scientists from May 22 to Sep. 21 1987, included water temperature measurements at different depths, ice thickness measurements, bathymetry and leveling profiles from the lake to Maxwell Bay. The data, which are presented on graphs, are similar to those obtained in 1969 and 1970, except for the water temperature, which was lower in 1987 (0-1°C, at 10 m depth) than in 1969 (2°C).

E-47605

Matsuoka, N., Moriwaki, K., **Frost heave and creep in the Sør Rondane Mountains, Antarctica, Arctic and alpine research**, Nov. 1992 24(4), p.271-280, 24 refs.

Frost heave, slope deformation, and ground temperature have been monitored over a 5 yr interval on ice-free mountains in Antarctica, where only diurnal frost action operates during the midsummer. The monitoring was done at three sites with similar soils but different local climates. Diurnal freeze-thaw cycles resulted in significant heave (max. 3.4 mm) and downslope movements (max. 1.5 cm/yr at the surface) on some wet slopes subject to both snow flurries and strong insolation. The estimation from the cumulative frost heave measurements indicates that frost creep is most responsible for the movements. The velocity profile, calculated using the values of thaw depth and frost heave, agreed fairly well with the actual profile, demonstrating that subsurface freeze-thaw frequency is the primary control of the profile. However, such activities are insignificant on the majority of slopes owing to little thawing and/or a moisture shortage. Significant frost heave and creep usually take place after the ground achieves water content of >5% and has thawed deeper than 7 cm. (Auth. mod.)

E-47611

Yemane, K., **Contribution of Late Permian palaeogeography in maintaining a temperate climate in Gondwana**, *Nature*, Jan. 7, 1993 361(6407), p.51-54, 50 refs.

Numerical simulations based on general circulation and energy-balance models consistently indicate that the high latitudes of Gond-

wana experienced seasonal extremes in climate during the Late Permian period. But palaeogeographic maps based on the distribution of climate-sensitive rocks, palynological and palaeobotanical data and dicynodont fossil records all imply a temperate climate. Recently, it has emerged from studies of Upper Permian fluviolacustrine deposits throughout southern Africa that the geography was dominated by a series of giant lakes, perhaps interconnected within major fluvial frameworks. These data and their implications for a temperate climate are reviewed. It is suggested that the discrepancy may be explained by the fact that the palaeogeography used in the models does not take into account the existence of these lakes and rivers, which would have had a major influence on the regional climate. The results demonstrate the importance of incorporating accurate palaeogeographies into numerical modelling studies when attempting to reconstruct past climates. (Auth. mod.)

E-47616

Abollino, O., **Speciation of iron in antarctic lake water by adsorptive cathodic stripping voltammetry**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore impatto ambientale. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: environmental impact. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.295-296, Reprinted from Analytical proceedings, Mar. 1991, Vol.28. p.72-73. 13 refs.

The adsorptive cathodic stripping voltammetry method, used for the speciation of iron in samples collected in Carezza Lake during the Italian Antarctic Expedition in 1989, is described. Analysis of data shows the following: more than 60% of the total iron present in the sample is associated with particulate matter, as it is detected only after acidification of the unfiltered sample; and nearly 80% of the dissolved iron is present in colloidal or strongly bound form, as it is released only after acid treatment. A peculiar feature of Carezza Lake water is that it is an example of a natural sample with little or no contamination by human activities.

E-47651

Bockheim, J.G., Wilson, S.C., **Soil-forming rates and processes in cold desert soils of Antarctica**, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskii, Pushchino, Pushchino Research Centre, 1992, p.42-56, Refs. p.54-56.

The authors examined 420 soils from 15 chronosequences in 10 regions of the Transantarctic Mountains and the Ellsworth Mountains. Rate functions were determined by plotting soil property versus time of exposure for soils ranging from Holocene to late Quaternary in age. The soil chronosequences occur in three climatic zones: subxerous (coastal), ultraxerous (plateau), and xerous (intermediate). The morphogenetic salt stage and the electroconductivity of the salt-enriched layer are predictive of total salts in the profile within a climatic zone. The distribution of salts in the profile also varies with climatic zone. In pre-late-Quaternary soils salt pans occur at shallower depths in ultraxerous soils but are thicker in xerous soils. The depth of staining (oxidation) is related linearly to age of exposure, independent of climatic zone. The proportions of silt and clay in the profile are dependent not only on drift age but also on drift composition. Rate functions for accumulation of weathering products for soils in warm, polar, and cold deserts were compared. Profile quantities of clay, Fe, and CaCO₃ are greatest in soils of equivalent age in warm deserts, followed by polar deserts, and cold deserts. However, soluble salts accumulate more readily in cold desert soils than in polar desert soils because of the greater aridity. (Auth. mod.)

E-47652

Campbell, I.B., Claridge, G.G.C., Balks, M.R., **Properties and genesis of cryosols at Marble Point, McMurdo Sound region, Antarctica**, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.59-66, 12 refs.

Cryosols at Marble Point, McMurdo Sound are formed predominantly from late Last Glaciation Ross Glacial Drift and show little pedogenetic development. The inclusion of some more weathered materials within the tills and soil profiles, and the remnants of soils on more weathered rock outcrops, suggest that the landscape was previously exposed to greater weathering. Soil properties are thus a result of a complex pedogenetic history. (Auth.)

E-47654

Bölter, M., **Organic matter and its availability to microorganisms in antarctic soils**, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.189-199, 22 refs.

Distribution and properties of organic matter were analyzed in soils from the Maritime and Continental Antarctic area. The soils could be classified as Cambisols and Leptosols with respect to their genesis and function in these environments. Organic matter is mainly concentrated in the upper horizons in thin layers of only a few centimeters. There is great variation in the concentration of organic matter. This variation depends on the plant cover and aspects of the microrelief. Analyses of the C/N ratio and the ratios between particulate and dissolved carbohydrates indicate differences in the structure of these terrestrial environments. Actual concentrations of dissolved carbohydrates show significant values of low molecular weight substances. Their relation to processes in soil formation and aspects of microbial metabolism are discussed. (Auth.)

E-47663

Boldrin, A., Rabitti, S., **Physico-chemical characterization of sediments**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore oceanografia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.103-108, Reprinted from *Berichte zur Polarforschung*, 1990, 68, p.82-87.

This article provides the physico-chemical description of sea bottom sediments and discusses their relations with overlying water characteristics along two transects from the ice shelf to the open waters in the eastern coastal area of the Weddell Sea (Halley Bay and Kapp Norvegia areas). This characterization is linked to the evaluation of the exchanges between water and sediment and, more generally, to the concept of a basic environmental frame for benthic meio- and macrofauna studies.

E-47665

Italy. Programma Nazionale di Ricerche in Antartide, **Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991** [Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991], Rome, ENEA, [1991], 506p., Refs. passim. For selected papers see E-47666, E-47669 through E-47671, E-47673, E-47676, F-47678, L-47667, L-47668, L-47672, L-47674, L-47675 and L-47677.

This is a collection of papers dealing with Earth Science in Antarctica; some of them are abstracts prepared for meetings. They re-

port on research performed within the framework of the Italian Antarctic Program and have been published in national and international journals. The aim of the collection is to simplify the access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. (Auth. mod.)

E-47666

Baroni, C., Orombelli, G., **Geomorphological and glaciological research during the 2nd P.N.R.A. expedition to Terra Nova Bay, 1986-1987** [Risultati preliminari delle ricerche geomorfologiche e glaciologiche svolte nella seconda spedizione del P.N.R.A. (Baia Terra Nova, 1986/87)], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.83-90, In Italian with English summary. Reprinted from *Acqua-Aria*, 1988, 4, p.431-438. 15 refs.

Glacial-geological observations were carried out at Terra Nova Bay. Evidence of at least 4 glaciations have been observed: the oldest two are referred to the pre-Pleistocene. All along the coastal belt the youngest glacial drift contains fragments of marine shells, supporting the hypothesis of the expansion of a grounded Ross Ice Shelf. Holocene glacier fluctuations were studied and two minor neoglacial advances have been observed. Near Edmonson Point a glacier advance has been dated to about 1000 years B.P. C-14 ages have been obtained for Holocene raised beaches, ranging from 5770 \pm 60 B.P. to the present. A rate of 3 mm/year can be estimated for the isostatic uplift during the last 4500 years. A geomorphological map at a scale of 1:10,000 has been produced for the area surrounding the Italian station. (Auth.)

E-47669

Lombardo, B., Montrasio, A., Pertusati, P., Salvini, F., **Geological features of central Victoria Land** [Lineamenti geologici della Terra Vittoria centrale], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.105-107, In Italian with English Summary. Reprinted from *Acqua-Aria*, 1988, 4, p.423-425.

In the austral summer of 1986-87, a team of the Italian Antarctic Expedition sampled basement rocks in the Transantarctic Mountains of Victoria Land, between the David and Mariner glaciers, mapping the region on a 1:250,000 scale. In addition to regional mapping, fieldwork was done to establish the lithostratigraphy of basement rocks in the Deep Freeze Range, and to reveal the metamorphic history of these rocks during the Cambro-Ordovician Ross Orogeny and the earlier Middle-Late Proterozoic orogenies. Significant relics of these were found for the first time in the Transantarctic Mountains during the 1985-86 expedition. (Auth. mod.)

E-47670

Orombelli, G., **Holocene raised beaches of Terra Nova Bay** [Le spiagge emerse oloceniche di Baia Terra Nova (Terra Vittoria, Antartide)], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.110-123, In Italian with English summary. Reprinted from *Accademia Nazionale dei Lincei, Rendiconti*, 1987, 81(4), p.403-416. 19 refs.

Holocene beaches raised to about 30 m above present sea level have been studied and dated at Terra Nova Bay. Minimum ages have been obtained from abandoned penguin rookeries, ranging from 5770 \pm 60 to 980 \pm 220 uncorrected C-14 years B.P. A maximum uplift rate of 3.5 mm/year can be derived for the last 4500 years. The highest raised beaches at +30 m a.s.l. could have been formed about 7000 years B.P. (Auth.)

E-47671

Salvini, F., **Multispectral calibration of satellite image geologic interpretation in Victoria Land** [Riprese multispettrali per la calibrazione della interpretazione geologica delle immagini satellite in Terra Vittoria (Antartide)], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.125-128, In Italian with English summary. Reprinted from *Acqua-Aria*, 1988, 4, p.427-430.

During the 2nd Italian Antarctic Expedition to southern Victoria Land, studies were carried out on electromagnetic reflectance spectra of rock in the optical range, in order to evaluate geological information obtained by satellite. These analyses were conducted through the identification and multispectral photographic recording of 42 test sites, representative of the main rock types cropping out in the region around Terra Nova Bay. This monitoring shows that, although more than 90% of the territory is covered by permanent ice, some of the main lithologies could be identified by means of multispectral analysis, such as granitoids, migmatitic gneiss with granulitic relicts and some fillads and mafites, while orthogneiss, micaschists and quartzites show similar spectra. (Auth. mod.)

E-47673

Casnedi, R., **Facies analysis of the Lower Paleozoic in north Victoria Land**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.231-233, Reprinted from the proceedings of the meeting "Scienze della Terra in Antartide", 3rd, Siena, Oct. 4-6, 1989, p.37-39. 5 refs.

North Victoria Land is composed of a collage of fragments or terranes, each with a distinctive stratigraphy and separated by tectonic contacts. Three tectonostratigraphic suspect terranes had been identified as possibly exotic to the East Antarctic Craton: the Wilson, Bowers and Robertson Bay. Wilson and Bowers have their distinct geological record and show evidence of having once been divided by an ocean; studies on the suture zone across these two terranes are in progress. Not so clear is the pertinence of Bowers and Robertson Bay to different terranes. Even if a displacement has been recorded at the contact, facies changes could explain a stratigraphic transition between these suspect terranes.

E-47676

Lombardo, B., Castelli, D., Rossetti, P., **Geology of crystal basement rocks of Victoria Land** [Ricerche geologiche sul basamento cristallino della Terra Vittoria (Antartide)], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.429-445, In Italian with English summary. Reprinted from *Bollettino della Associazione Mineraria Subalpina*, Mar.-June 1990, 27(1-2), p.27-44. Refs. p.39-44.

Since 1985 the Italian government has been supporting a National Program of Antarctic Research and a permanent station has been built at Terra Nova Bay, on the Ross Sea coast of Victoria Land. In this paper, the authors review the basement geology of northern Victoria Land and discuss some results of the Italian geological program. Highlights of the Italian work on basement geology include a geological map at a 1:500,000 scale, and structural and petrological studies on the metamorphic complex of the Wilson Terrane which suggest a polymetamorphic evolution, with relics of a Proterozoic granulite event overprinted by a green schist-to amphibolite-facies event of Cambrian (Ross) age. Other contributions include a better definition of regional metamorphic patterns and of granitoid petrology, and sedimentological studies on the low-grade sequences of the Wilson Terrane. (Auth. mod.)

E-47707

Grunow, A.M., Dalziel, I.W.D., Harrison, T.M., Heizler, M.T., **Structural geology and geochronology of subduction complexes along the margin of Gondwanaland: new data from the Antarctic Peninsula and southernmost Andes**, *Geological Society of America. Bulletin*, Nov.1992 104(11), P.1497-1514, Numerous refs.

Subduction complexes along the Andean margin in central and southern Chile yield mid-Paleozoic to lower Mesozoic ages, yet they crop out within 100 km of the modern trench that shows evidence of active accretion along much of its length. The scarcity of uplifted subduction-complex rocks younger than mid-Mesozoic along the Chilean margin and in parts of the Scotia Arc suggests that these old crystalline rocks, uplifted in the Triassic and Jurassic, represent a boundary in the forearc beyond which tectonic erosion does not easily occur. Based on new Ar-40/Ar-39 ages, the Scotia Arc subduction complexes reveal a complex history related to distinct local tectonic events, and are not a simple continuation of the old accretionary prism in Chile. Structural and metamorphic analysis indicates that the earliest and most penetrative deformation in the subduction complexes around the Scotia Arc occurred at some depth in a subduction zone or zones, certainly below the brittle-ductile transition, and in some cases under blueschist-facies conditions. It is concluded that the early subduction-related deformation and metamorphism in the greenschist- and blueschist-facies rocks of the Scotia Arc is overprinted by various events in the mid-Cretaceous, earliest- and mid-Cenozoic, and Early Neogene with respect to Elephant I., the Darwin Complex, Smith I., and the Gibbs Island Group. (Auth. mod.)

E-47712

Kennicutt, M.C., II, McDonald, T.J., Denoux, G.J., McDonald, S.J., **Hydrocarbon contamination on the Antarctic Peninsula. I. Arthur Harbor-subtidal sediments**, *Marine pollution bulletin*, Oct. 1992 24(10), p.499-506, 14 refs.

Near-field contamination in Arthur Harbor can be traced to spills, ship and boating activities, and run-off. Soil samples from Palmer Station and Old Palmer Station contain hydrocarbons derived from diesel fuel, lubrication oil, and hydraulic fluid. Most of the contami-

nation in subtidal sediments around Palmer Station is due to diesel fuel spills. Subtidal sediments below an abandoned open incineration site also contain combustion-derived polynuclear aromatic hydrocarbons (PAH). Soils collected at Old Palmer Station were also contaminated with diesel fuel residues and combustion-derived PAH. High concentrations of these contaminants were detected in nearby subtidal sediments. Small amounts of diesel fuel contamination are detectable throughout Arthur Harbor. Despite being abandoned for years, soils in the vicinity of Old Palmer Station and Base N represent the most concentrated source of contaminants in Arthur Harbor. Environmentally sound practices at Palmer Station have helped to minimize local contamination.

E-47714

Monastersky, R., **Fire beneath the ice**, *Science news*, Feb. 13, 1993 143(7), p.104-107, 1 ref.

Announcement is made of a submerged, active volcano beneath Ice Stream B on the West Antarctic Ice Sheet. Over the past six years, two researchers have made aerial radar investigations above the area and have found a layer of water-logged till below a depression in the ice stream. The presence of this lubricant was confirmed in 1990 when drillers pulled up samples of slurry sediments from beneath the ice. Working from the idea that the source producing the sink and the till could be a volcano, the two researchers brought more than seven kg of equipment and 25 computers to their field camp. Radar images outlined a mountain rising steeply under the ice to a summit 650 m above the surrounding bedrock. The peak is cone-shaped, roughly similar to Mt. Fuji. Furthermore, there is evidence that it is still active, erupting occasionally, and growing.

E-47715

Blankenship, D.D., **Active volcanism beneath the west antarctic ice sheet and implications for ice-sheet stability**, *Nature*, Feb. 11, 1993 361(6412), p.526-530, 17 refs.

It is widely understood that the collapse of the West Antarctic ice sheet (WAIS) would cause a global sea level rise of 6 m, yet there continues to be considerable debate about the detailed response of this ice sheet to climate change. Because its bed is grounded well below sea level, the stability of the WAIS may depend on geologically controlled conditions at the base which are independent of climate. In particular, heat supplied to the base of the ice sheet could increase basal melting and thereby trigger ice streaming, by providing the water for a lubricating basal layer of till on which ice streams are thought to slide. Ice streams act to protect the reservoir of slowly moving inland ice from exposure to oceanic degradation, thus enhancing ice-sheet stability. Presented here is aerogeophysical evidence for active volcanism and associated elevated heat flow beneath the WAIS near the critical region where ice streaming begins. If this heat flow is indeed controlling ice-stream formation, then penetration of ocean waters inland of the thin hot crust of the active portion of the West Antarctic rift system could lead to the disappearance of ice streams, and possibly trigger a collapse of the inland ice reservoir. (Auth.)

E-47735

Ikeda, Y., Kimura, M., **Mass distribution of antarctic ordinary chondrites and the estimation of the fall-to-specimen ratios**, *Meteoritics*, Sep. 1992 27(4), p.435-441, 29 refs.

The cumulative mass distributions (mass range > 100 g) of each type of Japanese and U.S. antarctic ordinary chondrites are compared with those of non-antarctic falls and those obtained from the present-day flux of meteorites. The steeper slope of the mass distribution of antarctic chondrites is indicative of the presence of several chondrite showers. The fall-to-specimen ratio of antarctic ordinary chondrites larger than 100 g is about 1:2, indicating that half of them are shower components. The fall-to-specimen ratios of each group range from 1:1 to 1:6; those of the Japanese and U.S. antarctic meteorite collections are 1:1 to 1:2 and 1:4 for H chondrites, 1:1 to 1:2 and 1:2 for

L chondrites, and 1:2 and 1:6 for LL chondrites, indicating that the Japanese collection includes less abundant shower components than the U.S. collection. The fall-to-specimen ratios of each H4-6 and L4-6 type range from 1:1 to 1:4, and U.S. H6 and Japanese H4 have the low ratios of 1:4. (Auth.)

E-47736

Maurette, M., Pourchet, M., Perreau, M., 1991 **EUROMET micrometeorite collection at Cap-Prudhomme, Antarctica**, *Meteoritics*, Sep. 1992 27(4), p.473-475, 7 refs.

An inventory of the 1991 EUROMET antarctic micrometeorite (AMM) collection is presented. Fifty grams of sediments were collected by filtration of 260 tonnes of melted ice water. Four sieve fractions were obtained and material from these is available from the EUROMET group. The few hundred milligrams of the 50-100 micron fraction are the most productive ones, in which 10% of the grains are AMMs. Input for planning a 1994 expedition to collect AMMs is also invited. (Auth.)

E-47737

Cassidy, W.A., **Meteorite collection sites of Antarctica**, *Meteoritics*, Dec. 1992 27(5), p.490-525, 90 refs.

Antarctic meteorites have been and are being well studied, but the potential for glaciological and climatological information in the sites where they are found is only beginning to be realized. To date, meteorite stranding surfaces have been identified only in East Antarctica: (1) the MacKay Glacier/David Glacier region contains the Allan Hills and the Reckling Moraine/Elephant Moraine stranding surfaces. (2) In North Victoria Land, ice diverges around Frontier Mountain and flows into a site behind the barrier where ablation occurs extensively. (3) Between the Beardmore and Law Glaciers, ice flows sluggishly into the southwestern margin of the Walcott N  v  . (4) The Transantarctic Mountains are submerged along one segment many hundreds of km in length by ice flowing off the Polar Plateau. (5) The immense Yamato Mountains meteorite stranding surface covers an area of about 400 sq km. So far, most meteorites have been recovered in the upper reaches of this blue ice field. (6) The S  r Rondane Mountains form a barrier to ice flow off the Polar Plateau. The major meteorite stranding surface associated with this barrier is the Nansenisen Icefield. The authors review five models for the production of meteorite stranding surfaces: (1) simple deflation of the ice sheet, in which ablation removes great thicknesses of overlying ice; (2) simple accumulation of direct falls on a bare ice surface that is not deflating; (3) ablation of ice trapped against a barrier; (4) deceleration of ice by a subice barrier; and (5) stagnation of ice by encounter with an ice mass able to produce an opposing flow vector. (Auth. mod.)

E-47740

Verkulich, S.R., Melles, M., **Composition and paleoenvironmental implications of sediments in a fresh water lake and in marine basins of Bunger Hills, Antarctica**, *Polarforschung*, 1990 (Publ. 1992) 60(3), p.169-180, With German summary. 24 refs.

Data on the sediment composition from four sediment cores, located in a freshwater lake and in two marine basins of Bunger Hills, are presented and discussed in respect of their paleoenvironmental implications. All investigated sediments are laminated. They consist predominantly of algae, mosses and clastics, and exhibit various, sometimes very high contents in carbonate, organic carbon and sulfur. The sediment composition is largely influenced by the salinity of the water, by the degree of ice coverage, by the supply of melt water, and by the glaciological and morphological conditions in the vicinity of the lakes. Three individual sediment units can be distinguished, each probably representing the same depositional time intervals at the respective sampling sites. Transitions between the units can be traced back to regional changes in the environmental conditions and therefore provide information concerning the paleoenvironmental and

paleoclimatical history in the oasis. Near the Pleistocene/Holocene boundary probably a marine transgression into the oasis occurred, resulting in the formation of marine basins. Presumably as a consequence of the postglacial isostatical uplift, parts of the basins were isolated from ocean water and by meltwater inflow transformed into fresh water lakes. Before reaching the recent environmental conditions, sampling sites in a large fresh water lake as well as in a marine inlet have been under anoxic conditions, presumably as a consequence of a cooler climate than that of today. (Auth.)

E-47743

Schulze, P., **Petrogenesis of the metamorphic basement complex of the central Heimefront Range (western Queen Maud Land, Antarctica)** [Petrogenese des metamorphen Grundgebirges der zentralen Heimefrontfjella (westliches Dronning Maud Land/Antarktis)], *Berichte zur Polarforschung*, 1992 No.117, 321p., In German with English summary. Refs. p.183-195.

This thesis contains the petrogenetic development of the metamorphic basement rocks of the central part of Heimefrontfjella (Sivorgfjella) and of North-Tottanfjella. Detailed geological mapping of this area in the antarctic summer 1989-90 demonstrated a northeast-southwest striking metaplutonic zone accompanied by volcano-sedimentary metamorphic series. The metamorphic rocks of the mountain ranges of H.U. Sverdrupfjella and Kirwanveggen in western Dronning Maud Land are assigned to the Sverdrupfjella Group because they show a similar evolution. All petrological, chemical mineralogical, metamorphic and fluid inclusion data of the investigated metamorphic Heimefrontfjella rocks support an assignment of these rocks to the Sverdrupfjella Group. This conclusion is of major importance for the reconstruction of Gondwana between southern Africa and western Dronning Maud Land. The Zimbabwe and Kaapvaal craton in Africa is enclosed in the south, southeast and east by a continuous Kibaran mobile belt. This belt includes the Namaqua-Natal Belt, presumably extending into the mountain ranges of western Dronning Maud Land (Heimefrontfjella, Kirwanveggen and H.U. Sverdrupfjella) which can be traced into the Mozambique Belt. (Auth. mod.)

E-47746

Taylor, E.N., Taylor, T.N., **Reproductive biology of the Permian Glossopteridales and their suggested relationship to flowering plants**, *National Academy of Sciences. Proceedings*, Dec. 1992 Vol.89, p.11495-11497, 27 refs.

The discovery of permineralized glossopterid reproductive organs from Late Permian deposits in the Beardmore Glacier region of Antarctica provides anatomical evidence for the adaxial attachment of the seeds to the megasporophyll in this important group of Late Paleozoic seed plants. The position of the seeds is in direct contradiction to many earlier descriptions, based predominantly on impression/compression remains. The attachment of the ovules on the adaxial surface of a leaf-like megasporophyll, combined with other features, such as megagametophyte development, suggests a simpler gymnospermous reproductive biology in this group than has previously been hypothesized. These findings confirm the classification of the Glossopteridales as seed ferns, and are important considerations in discussions of the phylogeny of the group, including their suggested role as close relatives or possible ancestors of the angiosperms. (Auth.)

E-47753

Isbell, J.L., **Fluvial sedimentology and basin analyses of the Permian Fairchild and Buckley Formations, Beardmore Glacier region, and the Weller Coal Measures, southern Victoria Land, Antarctica**, Columbus, Ohio State University, 1990, 347p., University Microfilms order No. 91-11718, Ph.D. thesis. Refs. p.329-347.

The Beardmore Glacier region contains a 1 km thick Permian fluvial sequence that was deposited in an elongate basin along the margin of the east antarctic craton. Fluvial architecture, sandstone composition and paleocurrents within the basin record a change from an early Permian cratonic to a late Permian foreland basin. The Lower Permian Fairchild Formation (250 m thick) consists entirely of overlapping channel-form sandstone bodies deposited by braided streams. The Buckley Formation was deposited within a braided stream setting and is an important unit because it contains interstratified channel-sandstone sheets, shale and coal, along with evidence of channel-belt avulsions. The Lower Permian Weller Coal Measures (250 m thick) in southern Victoria Land were deposited within a narrow basin located cratonward of the foreland basin. Basin geometry and depositional patterns are similar to those of fault-bounded basins. Deposits consist of an axial lacustrine facies with coarse-grained fluvial facies along the edge of the basin. Although basin formation is not constrained, deposition of the Weller was contemporaneous with the development of the foreland basin. This suggests a relationship between subsidence within the two basins. (Auth. mod.)

E-47754

Kim, K.H., **Biostratigraphic and paleoceanographic significance of Paleogene radiolarian assemblages from the subantarctic south Atlantic**, De Kalb, Northern Illinois University, 1991, 239p., University Microfilms order No. 92-14463, Ph.D. thesis. Refs. p.204-220.

Biostratigraphic and paleoenvironmental analyses of Paleogene radiolarians from the high-latitude South Atlantic have been documented, based on material collected on Ocean Drilling Program (ODP) Leg 114. The thick and relatively complete Paleogene sequences (65-24 Myr), and a nearly continuous history of geomagnetic polarity reversals from ODP Leg 114 cores provide an unparalleled opportunity to establish for the first time a Paleogene radiolarian zonation for the high-latitude southern ocean. A total of 58 taxa have been analyzed biostratigraphically in this study. Seventeen of these species are left in open nomenclature, and eight new species are described. It appears that the evolution of paleoceanographic systems produced major effects upon radiolarian distribution, productivity, and diversity during the Paleogene. Middle to Late Paleocene radiolarian assemblages contain some warm-water and cosmopolitan species. A peak in radiolarian diversity and abundance during the Early Eocene indicates that this was perhaps the warmest interval of the entire Cenozoic. However, species diversity decreased during the Late Eocene. These changes clearly record the transition from relatively warmer conditions of the Eocene to distinctly cooler conditions of the Oligocene. (Auth. mod.)

E-47755

Scherer, R.P., **Diatom paleoproductivity and sediment transport in west antarctic basins and the Neogene history of the West Antarctic Ice sheet (WAIS)**, Columbus, Ohio State University, 1992, 272p., University Microfilms order No. 92-19017, Ph.D. thesis. Refs. p.223-246.

The abundance of resting spores of the diatom genus *Chaetoceros* in modern antarctic sedimentary systems is shown to approximate the intensity of primary productivity at time of deposition. Miocene paleoproductivity in west antarctic basins is evaluated by comparing quantitative diatom assemblage data from the modern Antarctic Peninsula with similar data from the interior of West Antarctica. Micropaleontological approaches are used to evaluate glaciological models of ice stream flow and reconstruct glacial-sedimentary provenance. A schematic model of west antarctic stratigraphy is presented in the form of a cross section through the Ross Embayment. This cross section describes the current configuration of the WAIS with regard to glacial erosion and deposition, and predicts that Plio-Pleistocene sediments are preserved in the deep basins of West Antarctica. (Auth. mod.)

E-47758

Huber, B.T., Watkins, D.K., **Biogeography of Campanian-Maastrichtian calcareous plankton in the region of the southern ocean: paleogeographic and paleoclimatic implications**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.31-60, Refs. p.56-60.

Analysis of biogeographic distribution patterns among Campanian-Maastrichtian calcareous nannoplankton and planktonic foraminifera from the southern high latitudes provides insight into changes in circum-antarctic climate and surface circulation routes. Both microfossil groups are similarly characterized in the early Campanian by low-diversity, cosmopolitan species with few or no austral provincial taxa. This changes by late Campanian-early Maastrichtian time as austral species diversified and began to dominate the high-latitude assemblages. Maximum diversity of austral provincial taxa occurs during the late Campanian among the planktonic foraminifera and in the early Maastrichtian among the calcareous nannoplankton. Climatic cooling is considered the cause for the decline from 53 nannofossil species during the early Maastrichtian to 20 species toward the end of the Maastrichtian as well as the equatorward shifts of the nannofossil *Nephrolithus frequens* and the planktonic foraminifer *Abathomphalus mayaroensis* during the late Maastrichtian. On the other hand, the poleward migrations of the planktonic foraminifer *Pseudotextularia elegans* and the nannofossil *Watznaueria barnesae* less than 500,000 years before the Cretaceous/Tertiary extinction event correspond with a negative $\delta^{18}O$ -18 excursion observed at Maud Rise Site 690, suggesting that these species shifts were caused by a brief high-latitude warming event. (Auth. mod.)

E-47759

Askin, R.A., **Late Cretaceous-Early Tertiary antarctic outcrop evidence for past vegetation and climates**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.61-73, Refs. p.71-73.

Fossil plant remains from the Late Cretaceous-early Tertiary antarctic vegetation occur in exposed outcrops in the South Shetland Is. and James Ross Basin, Antarctic Peninsula area. These remains include foliage, wood, and palynomorphs, all of which provide useful information on the past high-latitude floras and their ambient environments. During the Late Cretaceous and Paleocene, conifer-dominated (podocarp and araucarian) rain forest prevailed. Angiosperm diversification reached its peak during the Campanian-Maastrichtian, at which time mixed conifer-Proteaceae-*Nothofagus* rain forest floras are evident. Humid conditions continued throughout the Late Cretaceous-early Tertiary in the Antarctic Peninsula region, with climates varying between cool and warm temperate. Plant evidence suggests cooling through the Maastrichtian into the early Paleocene, with a brief warm interval in the latest Maastrichtian. Diverse angiosperm-rich Paleocene-Eocene floras grew in relatively warm conditions. There was a shift to *Nothofagus*-dominated vegetation in the Eocene. Reduction in vegetational diversity in the late Eocene/Oligocene and through the Oligocene is consistent with cooling through the late Paleocene. (Auth. mod.)

E-47760

Wei, W.C., **Paleogene chronology of southern ocean drill holes: an update**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.75-96, 30 refs.

Fairly detailed magnetostratigraphies for different intervals of the Paleocene have recently become available for nine ODP sites (689,

690, 700, 703, 744, 747, 748, and 752) in the southern ocean. This allows direct correlations of calcareous nannofossil and planktonic foraminifer datums with magnetostratigraphies and estimates of their numerical ages in the southern ocean. On the basis of these direct biomagnetostratigraphic correlations, published magnetostratigraphies for some intervals from southern ocean sites 690, 699, 700, and 703 are reinterpreted, and age-depth curves for these sites and sites 702, 737, 738, and 748 are constructed/reconstructed, using the applicable published or reinterpreted magnetostratigraphic data and revised ages of biostratigraphic datums. The revised age models provide a more accurate time framework for these sediment sequences. (Auth. mod.)

E-47761

Robert, C., Chamley, H., **Late Eocene-Early Oligocene evolution of climate and marine circulation: deep-sea clay mineral evidence**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.97-117, Refs. p.116-117.

Changes in clay mineral associations of marine sediments across the Eocene to Oligocene transition exhibit regional differences because large oceanic and associated continental regions acted as distinct thermal systems. Illite abundance in and around East Antarctica resulted from the development of poorly weathered soils associated with the development of glacial conditions. Dramatically decreased continental weathering in East Antarctica resulted from cooling due to oceanic development that thermally isolated the continent and reduced the energy budget at southern high latitudes. This activated meridional thermal exchanges (poleward surface circulation warmed the southwest Atlantic margins and equatorward currents cooled the southeast Atlantic margins), proto-antarctic bottom waters formed along the east antarctic margin, and the influence of these waters expanded through the southern ocean and southern South Atlantic, while deep circulation was reinforced locally from low-latitude areas other than the Tethys. Climatic and paleoceanographic development at the Eocene/Oligocene transition is principally the consequence of expansion of the southern ocean which resulted in a dramatic cooling of East Antarctica and associated formation and circulation of cold water, beginning at about 37.5-38.0 Ma during the latest Eocene, and restriction of the Tethys Ocean which resulted in decreased formation and circulation of Tethyan warm deep waters and associated transfer of heat, beginning at about 35.5-36 Ma during the earliest Oligocene. The Eocene/Oligocene transition reflects a threshold of climatic and oceanographic consequences of plate tectonic evolution. (Auth. mod.)

E-47762

Case, J.A., **Evidence from fossil vertebrates for a rich Eocene antarctic marine environment**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.119-130, Refs. p.129-130.

The late Eocene fossil marine and terrestrial biota recovered from deposits on Seymour I. indicate that cool temperate climatic conditions prevailed. This interpretation agrees with oxygen isotope data from marine drill cores taken from the Weddell Sea. Sharks and penguins, the two major groups of fossil marine vertebrate taxa based on abundance of specimens recovered from the La Meseta Formation, Seymour I., show a remarkable level of species diversity for a cool temperate marine environment. Fourteen species of sharks have been recorded from a single locality within Unit Tlm 5 of the La Meseta Formation, while 6 species of penguins representing 6 distinct size classes have been noted in 2 localities in Unit Tlm 7. During the late Eocene, both sharks and penguins occupied positions at the

top of the marine trophic structure. The amount of biomass and possible diversity suggested at all trophic levels implies a very rich late Eocene marine environment in the cool temperate waters east of the Antarctic Peninsula. Currently, high levels of productivity and biomass are generated in cool temperate marine environments only where coastal upwelling occurs. The waters off the east coast of the Antarctic Peninsula may have been such an area of upwelling during the late Eocene. This evidence indicates that the onset of upwelling conditions around Antarctica began in the late Eocene. Major upwelling conditions are predicted by paleoceanographic models to occur by the late Oligocene. (Auth. mod.)

E-47763

Long, D.J., **Paleoecology of Eocene antarctic sharks**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.131-139, Refs. p.137-139.

A diverse shark assemblage consisting of 17 taxa in 10 families has been collected from the middle to late Eocene La Meseta Formation on Seymour I. Paleocological associations with the diverse shark assemblage suggest a temperate marine environment for the La Meseta Formation with 4 ecological components: a resident shallow water community dominated by *Carcharias macrotis*; a deepwater fauna consisting mainly of squaloid sharks that occasionally entered the La Meseta area from deeper offshore areas through daily or seasonal vertical migrations; a transitional eurybathic group of sharks that inhabited both inshore shallow and offshore pelagic and deep areas; and shallow water tropical migrants that occasionally entered the La Meseta area from warmer northern areas. (Auth.)

E-47772

Grobe, H., Mackensen, A., **Late Quaternary climatic cycles as recorded in sediments from the antarctic continental margin**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.349-376, Refs. p.373-376.

To reveal the late Quaternary paleoenvironmental changes at the antarctic continental margin, a lithostratigraphy adjusted to a stable isotope record from the eastern Weddell Sea is tested. The stratigraphy is used to produce a stacked sedimentological data set of 11 sediment cores. A general model is derived of glaciomarine sedimentation and paleoenvironmental changes at the east antarctic continental margin during the last two climatic cycles (300 kyr). The sedimentary processes considered include biological productivity, ice rafting, current transport, and gravitational downslope transport. These processes are controlled by a complex interaction of sea level changes and paleoceanographic and paleoglacial conditions in response to changes of global climate and local insolation. Sedimentation rates are mainly controlled by ice rafting, which reflects mass balance and behavior of the antarctic ice sheet. The sedimentation rates decrease with distance from the continent and from interglacial to glacial. Highest rates occur at the very beginning of interglacials, i.e., of oxygen isotope events 7.5, 5.5, and 1.1, these being up to 5 times higher than those during glacials. The sediments can be classified into five distinct facies and correlated to different paleoenvironments. (Auth. mod.)

E-47773

Boltovskoy, D., Alder, V.A., **Paleoecological implications of radiolarian distribution and standing stocks versus accumulation rates in the Weddell Sea**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.377-384, Refs. p.383-384.

In the Scotia and Weddell Seas, polycystine radiolarians dwell chiefly at depths between 200 and 300 m, their vertical patterns being strongly associated with the higher temperatures characteristics of the Warm Deep Water. At scales of approximately 400 to 2000 km and 30 days, radiolarian horizontal quantitative distribution trends are not visibly affected by ice cover or primary production. On the other hand, comparison of polycystine standing stocks at 0 to 400 m versus their accumulation rates at 400 to 900 m indicates that >90% of the shells are lost to sedimentation. It is suggested that mechanical fragmentation by grazing (rather than dissolution) is primarily responsible for this loss. Deep habitat and high destruction rates in the water column are important factors which hinder the use of antarctic polycystine thanatocoenoses for paleoecological reconstructions. (Auth.)

E-47817

Van Der Wateren, F.M., Verbers, A.L.L.M., **Cenozoic glaciation of the Rennick Glacier area, the Everett Range and Yule Bay area, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.73-77, 25 refs.

The main objective of this program is a comparison of the glacial history of blocks in the Transantarctic Mountains which have undergone different amounts of tectonic uplift, combined with Be-10 dating of summit plateaus and various lower (and supposedly younger) glacial landforms. In North Victoria Land four fieldwork areas arranged along a profile crossing the Rennick Graben were selected; it was assumed they had undergone different amounts of uplift. Granites were sampled for fission track dating; quartz samples were taken from striated bedrock for Be-10 dating to determine exposure ages of deglaciated surfaces; till, rock, and algae samples were collected for SEM, X-ray diffraction, microfossils, grain size, heavy minerals and soil chemical analyses and C-14 dating.

E-47818

Verbers, A.L.L.M., Van Der Wateren, F.M., **Glacial geology of the area between David and Mawson Glaciers. A reconnaissance of the southern Prince Albert Mountains, Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.78-81, 4 refs.

The area studied, consisting of a large number of nunataks interrupting enormous ice fields, has not yet been a subject of comprehensive glacial-geological investigation. Reconnaissance flights were made by helicopter from the *Polar Queen*, while fieldwork was carried out from a field camp located at an ice-cored moraine bordering Morris Basin, Ricker Hills. Quartz samples were taken from glaciated surfaces for Be-10 exposure dating; soils, when present, were described and sampled for chemical analyses; till samples were taken for chemical, grain size distribution and microfossil analyses. Undisturbed oriented till samples were taken for thin section analysis; rock samples were collected for SEM studies of weathered surfaces and salt crusts, and algae were collected for C-14 dating. A bathymetrical map was made of the seafloor south of the Drygalski Ice Tongue with the help of echo sounding on board the *Polar Queen*. All this work is aimed at finding evidence of the relationship between the Cenozoic mountain uplift and the glacial history of the area.

E-47819

Wörner, G., Orsi, G., **Volcanic observations on Scott Island in the antarctic ocean**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.82-83, 5 refs.

Scott I. is a small rocky oceanic island in the southern ocean located at 67.4S, 179.1W. Reconnaissance sampling had been undertaken early during GANOVEX II in 1982, but samples and records were later lost when the expedition ship *Gotland* sank. Scott I. was visited by GANOVEX VI in order to provide more volcanological, petrographical and geochemical information on this small oceanic island. The oceanic plateau is about 145 km long, 30 km wide and 300 m deep. Echo soundings suggest a rather irregular topography between 200 and 400 m with several steep submarine slopes. Scott I. represents the peak of this submarine plateau. It is about 350 by 200 m in size with a maximum elevation of ca. 60 m. It is composed entirely of two overlying subaerial lava flows with columnar joints and typical basal breccias and blocky, scoriaceous flow tops with crudely developed pressure ridges. The latter indicate flow directions toward the N and S from the highest point of the island. The upper, thicker flow can be correlated to a rocky, tower shaped island 200 m to the W. Flow morphology and thickness indicate that these flows formed from evolved viscous lava descending over rather steep topography. The island is bounded by steep wavecut cliffs; there is no evidence for any glacial or other erosion of the island.

E-47820

Wörner, G., Orsi, G., **Volcanic geology of Edmonson Point, Mt. Melbourne volcanic field, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.84-86, 7 refs.

The Edmonson Point volcanic complex is part of the Mt. Melbourne Volcanic Field of the McMurdo Volcanic Group of Victoria Land. McMurdo Volcanics occur within and to the west of the Transantarctic Mountains and are related to rifting processes within the Ross Sea basin. Rapid uplift of the Transantarctic Mountains during the past 50 My and deep burial of Cenozoic sediments within the Victoria Land Basin and Terror Rift are the main structural features of this rift system in the study area. Typical rift-related lavas of the Mt. Melbourne Volcanic field range from basanites and alkalibasalts to highly evolved comenditic trachytes. Where eruptions have taken place below glaciers, a complex succession from subglacial to subaerial volcanics may be observed which can be of use to determine glacial history.

E-47821

Wörner, G., **Kirkpatrick Lavas, Exposure Hill Formation and Ferrar Sills in the Prince Albert Mountains, Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.87-90, 2 refs.

The Prince Albert Mountains are part of the Transantarctic Mountains (TAM) chain in central Victoria Land. The Transantarctic Mountains are the uplifted western shoulder associated with the Cenozoic Ross Sea Rift system. The Prince Albert Mountains differ from the regions to the N and S by its lower elevations, subdued morphology as well as geophysical aspects. Tilting and uplift appears to be less than elsewhere in the TAM. These features make this area particularly suited, geologically and logistically, to study Jurassic igneous rocks which are well exposed in a complete section. This section has been sampled for geochemical and isotopical analyses on bulk rocks and mineral separates. Here, the field aspects of the Jurassic igneous sequence are described. Older literature introduced the terms "Ferrar Dolerites" and "Kirkpatrick Basalts" for intrusive, mostly coarse-grained sills and subaerial lavas, respectively. Petrographic and chemical analyses have shown that truly basaltic compositions rarely exist in these rocks. On the other hand, lava flows may reach ten to a hundred meters in thickness, resulting in coarse-grained "dolerite" textures. For these reasons the terms "Ferrar Sills" and "Kirkpatrick Lavas" are more appropriate and will be used here. (Auth.)

E-47822

Tessensohn, F., **Johnnie Walker formation: a pre-granite harbour subvolcanic unit in the Wilson Terrane, lower Mawson Glacier, Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.91-95, 8 refs.

The name "Johnnie Walker Formation" is proposed here for the unit of non-metamorphic andesitic and rhyolitic rocks which occur north of the Convoy Range in the Transantarctic Mountains. The investigated outcrops are located in the southern extension of the medium to high-grade metamorphic Wilson Terrane of the Paleozoic Ross foldbelt. The name is taken from Walker Rocks, a group of nunataks in the lower Mawson Glacier, 25 km from the Ross Sea coast. Walker Rocks consist of three nunataks, only two of which are represented on the 1:250,000 map of the Convoy Range. The new formation is exposed on the largest and southernmost of these nunataks. A type section is chosen through the outcrop of the southernmost Walker Rock from NW to SE. The base of the new formation is formed by an unconformable, non-tectonic contact with folded and metamorphosed Priestley schists. As the top of the formation is not exposed, only a minimum thickness can be estimated, on the order of several hundred m. The formation is bordered on its southern and western flanks along an intrusive contact by different granitoids of the Granite Harbour Intrusive suite: grey Larsen and red Irizar-type granites. Younger granitic dikes cut through the contact into the Johnnie Walker Formation. Thus, the Johnnie Walker Formation is stratigraphically younger than Priestley schists and older than Granite Harbour Intrusives.

E-47823

Stackebrandt, W., Thiedig, F., **Young tectonic activities in the coastal range of central Victoria Land**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.96-98, 6 refs.

The character of parts of the Ross Sea area as a meridionally oriented rift system has been recognized in recent years. At the same time, the morphogenesis of the Transantarctic Mountains has been estimated by fission track data and other methods to be younger than 50 my. The subsidence of rift related grabens as well as the uplift of the mountain ranges adjacent to the west seem to have a uniform genetical source. In addition, the morphogenesis of the North Victoria Land coastal ranges was explained to be the result of shoulder uplift in relation to the second phase of the Ross Sea rifting, which started in the Upper Paleogene. Up to now, this interpretation is based mainly on geophysical data from the Ross Sea. Therefore, the study of the younger tectonic development in central North Victoria Land was one of the topics of the GANOVEX team in 1990/91. In this paper, preliminary results are presented of these studies in the coastal region from Terra Nova Bay to Lady Newnes Bay, as well as between the Priestley and Larsen Glaciers. The focus is on field measurements of fault and dike orientations, age relations of different dike generations, as well as the character and sense of motion on fault planes. Prior to the field studies, LANDSAT images and aerial photographs had been analyzed. Since younger syngenetic sediments in the coastal ranges are missing, it is difficult to determine the exact ages of the observed post-Ross tectonic events.

E-47824

Thiedig, F., Stackebrandt, W., **Agmatites, basaltic intrusions and younger deformations in the "Berliner Mauer," Cape Sibbald, Aviator Glacier Tongue, north Victoria Land**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.99-100, 4 refs.

The southern part of the Mountaineer Range forms a dissected high plateau between Parker and Aviator glaciers. The highest peak is approximately 2330 m above sea level. For this peak the authors propose the name "Brandenburger Spitze" (Brandenburg Peak). To the south, the plateau drops down to the Aviator Glacier, in a nearly vertical, 1200 m high bluff with some spectacular icefalls. For this

bluff the name "Berliner Mauer" (Berlin Wall) is proposed; for a small tower-like detached rock at Cape Sibbald the authors suggest the name "Checkpoint Charlie". During several helicopter landings it was possible to climb down to the foot of this big bluff to collect samples.

E-47825

Klee, S., Baumann, A., Thiedig, F., **Age relations of the high grade metamorphic rocks in the Terra Nova Bay area, north Victoria Land, Antarctica: a preliminary report**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.101-106, 4 refs.

Samples of high grade metamorphic basement rocks of Wilson Terrane cropping out in the Deep Freeze Range and on Kay I. were collected during GANOVEX VI to study their isotopic evolution. The age and origin of granulite facies gneisses and of their migmatite host rocks are especially of interest for the interpretation of the geological and tectonic development of North Victoria Land. Another important research aspect is the influence of the polyphase metamorphic evolution on the isotopic systems of whole rocks and minerals like zircon, garnet, orthopyroxene, amphibole and feldspar. Two samples of paragneisses collected nearly 500 m northeast of Gondwana Station have been analyzed so far. They are part of the high grade basement complex. Sample ANT 102 is a medium grained biotite-feldspar-gneiss, sample ANT 104 is a fine grained garnet-biotite-gneiss. Both samples contain zircons and monazites as accessory minerals which were analyzed by conventional U-Pb dating.

E-47826

Kleinschmidt, G., Matzer, S., **Structural field observations in the basement between Fry and Reeves Glaciers, Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.107-109, 9 refs.

The basement of Victoria Land between Fry and Reeves Glaciers forms a 20 to 30 km wide strip along the coast of the Ross Sea. It consists mainly of granitoids of Ross age, i.e. approximately 500 Ma. They can be divided into clearly post-tectonic, red-colored plutons and so-called syntectonic grey varieties sometimes showing a measurable foliation of probably magmatic origin.

E-47827

Fenn, G., Henjes-Kunst, F., **Field relations of Granite Harbour intrusives and associated dikes from the USARP Mountains, north Victoria Land, and Prince Albert Mountains, central Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.110-112, 8 refs.

This report summarizes the field results of a sampling project carried out during GANOVEX VI in north Victoria Land. Samples were collected for petrographical, geochemical and geochronological analyses. These investigations will help to get a better understanding of the temporal, spatial and geochemical evolution of the igneous activity in the course of the Ross Orogeny.

E-47828

Henjes-Kunst, F., **Sampling scheme for geochronological investigations on Devonian-Carboniferous Admiralty intrusives and their country rocks in north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.113-116, 9 refs.

This report presents the results of a sampling project on Admiralty Intrusives granitoids and their country rocks from northern North Victoria Land, carried out during GANOVEX VI in the austral summer of 1990/91. Rock samples were mainly collected for geochronological investigations, the aims of which are twofold: (i) to get a better estimate of the crystallization ages, and hence the intrusion ages of the

Admiralty Intrusives plutons, and (ii) to date more precisely the Ross related metamorphism and deformation of the low-grade metasediments in the Wilson, Bowers, and Robertson Terranes.

E-47829

Tessensohn, F., Kleinschmidt, G., Henjes-Kunst, F., Fenn, G., **Gradational east-west increase in metamorphism in the basement rocks of the Helliwell Hills, Wilson Terrane, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.117-120, 12 refs.

When it became a serious possibility that important thrust planes discovered in the basement north of this area might continue through the Helliwell Hills, it was decided to revisit the area during GANOVEX VI. Apart from the search for evidence of these thrust planes, there were two more structural questions to be answered: (i) the nature of the contact between Beacon/Ferrar cover rocks and basement rocks (mapped as a fault in 1974), and (ii) within the basement, the nature of the contact between low-grade rocks in Boggs Valley and high-grade rocks further west. A gradational increase in metamorphism from phyllite to fibrolite-bearing micaschist on a 4.5 km long section had been described previously but without special reference to the location of the profile. A one-day helicopter-supported reconnaissance mapping was carried out in the area with landings on many key outcrops. The results confirm that there is in fact a dramatic increase in metamorphic grade from phyllites to fibrolite-bearing schists across 4.5 km of the section as described in 1982. This increase is gradational; the effect of the later Helliwell Fault is unimportant. It is thought that the Helliwell Hills section provides important evidence for a very basic question in the geology of the Wilson Terrane.

E-47830

Matzer, S., **Geological and structural field observations in the Carryer Glacier area, Bowers Mountains, northern Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.121-123, 7 refs.

The area investigated is located at the southern flank of Carryer Glacier along an 8 km long profile from the Rennick Glacier to the east. Within the working area, the Carryer Conglomerate (Leap Year Group) crops out in the west and the Glasgow Formation in the east. The Carryer Conglomerate rests unconformably on volcanic breccia of the Glasgow Formation. The contact is overturned by folding to the west. The red colored polymictic Carryer Conglomerate consists almost entirely of pebbles with sandy matrix and subordinate sandstone and local mudstone. To the east, quartzose sandstone increases. Close to the transition to the Glasgow Formation the quartzose sandstone shows more and more intercalations of red colored mudstones. The eastern part of the working area was mapped in 1986 as Glasgow Formation. This Formation is subdivided into flows, volcanic breccia and conglomerate with muddy matrix, pillows and intrusive rocks. Lenses of limestones within black schists and turbiditic rocks were observed as well. These latter rocks were described in 1986 as the Molar Formation. Within the working area, the Molar Formation interlaces with the Glasgow Formation.

E-47831

Kleinschmidt, G., **Southern continuation of the Wilson thrust**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.124-127, 8 refs.

The Wilson thrust was discovered during GANOVEX V (1988/89) and identified at that time for some 80 km in the Wilson Hills in northwestern Victoria Land from Axtheim Ridge (Noll Glacier) to McCain Bluff. The thrust is situated within the Wilson Terrane, trends about NNW-SSE and dips to the WSW. The upper plate is thrust to the NNE. At McCain Bluff, rocks resembling the meta-turbidites of the Morozumi Range are overthrust by Wilson migmatites. Therefore, a southern prolongation of the Wilson thrust was as-

sumed also between granitoids of Renirie Rocks and metaturbidites of Lonely One Nunatak, and between basement of the Helliwell Hills (SW) and the metaturbidites of the Morozumi Range. Field work during GANOVEX VI aimed to produce evidence supporting these assumptions.

E-47832

Kleinschmidt, G., **Structural observations in the Robertson Bay terrane and their implications**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.128-132, 15 refs.

North Victoria Land consists of three terranes: (i) the predominantly gneissic Wilson Terrane to the west, (ii) the chiefly meta-volcanic Bowers Terrane in the center, and (iii) the Robertson Bay Terrane to the northeast. The latter comprises turbidites of the probable Cambrian Robertson Bay Group, which were metamorphosed and folded during the Ross Orogeny approximately 500 Ma. They were intruded by the granitic Admiralty Intrusives 360 Ma. The uniform style of folding in the Robertson Bay Terrane requires a major detachment underneath the Robertson Bay Group. Another master fault on top of the Robertson Bay Group, i.e. a nappe thrust plane, which was demanded because of its degree, uniformity and character of metamorphism, is supported by possible klippen within the realm of the Robertson Bay Terrane, deriving from Bowers and Wilson Terranes.

E-47833

Kleinschmidt, G., Matzer, S., Henjes-Kunst, F., Fenn, G., **New field data from Surgeon Island, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.133-134, 4 refs.

The foliated Surgeon I. granitoid consists of quartz mainly of blue color, two feldspars, primary igneous biotite showing kink bands, and secondary muscovite (sericite) which is aligned in the foliation plane. Foliation is also seen in abundant melanocratic xenoliths which are of sub-elliptical shape. Rb-Sr dating of muscovite separates from the Surgeon I. granitoid yielded apparent ages of about 480 Ma. These dates suggest that the deformation of the Surgeon I. granitoid can be related to the Ross Orogeny. Rb-Sr dates of about 360 Ma on igneous biotites may then indicate a still later thermal disturbance of the Surgeon I. granitoid in the course of the Devonian-Carboniferous Admiralty Intrusives magmatism. The foliated Surgeon I. granitoid is intruded at the northern coast line by a newly discovered small leucogranite. Specimens were collected from the foliated rocks in order to determine the temperature conditions during formation of the shear planes, and from both the foliated and unfoliated rocks for petrographical investigation, geochemical analysis and isotopic dating.

E-47836

Delisle, G., **EUROMET I - New meteorite finds near Frontier Mountain, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.140-142, 6 refs.

Meteorites in North Victoria Land were found for the first time during the GANOVEX IV expedition in 1984 in an ice cored moraine field in a small valley at the SE end of Frontier Mountain. This find in a locality considered hitherto as an unlikely place for a meteorite concentration renewed interest in the investigation of the ice dynamic processes which build up meteorite concentrations on ice surfaces. In this context, the glaciology at the Allan Hills Icefield, one of the most productive antarctic meteorite fields, was studied in 1988/89. The result of this investigation did imply that actually only a small portion of the meteorite field at Frontier Mountain had been detected during GANOVEX IV. At the end of 1989, a European-wide initiative of scientists active in meteorites formed EUROMET, an interest group whose purpose is threefold: (i) to intensify the European effort to search for meteorites in Antarctica (and other desert regions); (ii) to analyze the extraterrestrial material in laboratories, and (iii) to transfer the material to European research institutions and museums.

E-47851

Shimoyama, A., Naraoka, H., Komiya, M., Harada, K., **Analyses of carboxylic acids and hydrocarbons in antarctic carbonaceous chondrites, Yamato-74662 and Yamato-793321**, *Geochemical journal*, 1989 23(4), p.181-193, Refs. p.192-193.

Analyses of the Yamato-74662 carbonaceous chondrite (C2) showed the presence of carboxylic acids, and aliphatic and aromatic hydrocarbons with various structural isomers, while those of the Yamato-793321 chondrite (C2) did not. The amounts of these compounds in Yamato-74662 are similar to those reported in the Yamato-791198 chondrite (C2) but less than in the Murchison chondrite (C2). The presence of various structural isomers in carboxylic acids and aromatic hydrocarbons indicated an abiotic origin, and therefore that these compounds are indigenous to the chondrite. n-Alkanes and other homologs of aliphatic hydrocarbons were found. However, these aliphatics may not be indigenous, especially under the finding of pristane and phytane. A potential use of the relative amounts of 1-methylnaphthalene and 2-methylnaphthalene was proposed to deduce the extent of thermal alteration. The result was: Yamato-74662 < Yamato-791198 equal to or less than Murchison. Yamato-793321 probably received the alteration too intensely for these organic compounds to survive and is beyond estimation by this method. (Auth.)

E-47854

Chapman, J.L., Smellie, J.L., **Cretaceous fossil wood and palynomorphs from Williams Point, Livingston Island, Antarctic Peninsula**, *Review of palaeobotany and palynology*, Nov. 20, 1992 74(3/4), p.163-192, 8 refs.

Terrestrial palynofloras from two localities on Williams Point, Livingston I., contain angiosperm monocolpates and tricolpates and can be dated as Cenomanian-early Campanian. This fixes the age for a collection of 15 silicified wood fragments described as 6 palaeotaxa; three are gymnosperm woods (Coniferwood-spacedpits, Coniferwood-clusteredpits, Coniferwood-lowrays) and three angiosperm woods (Dicotwood-heterorays, Dicotwood-multiserirays, Dicotwood-dumpirays). The palynofloras and wood specimens indicate a species rich, mixed conifer and dicotyledonous angiosperm forest, possibly with a complex standard tree and understory structure. This forest was growing at a palaeolatitude of about 59S during the Late Cretaceous. The use of palaeotaxa rather than the ICBN system for fossil material is discussed, and a brief description of the classification system proposed by Hughes (1989) is given in an Appendix. (Auth.)

E-47855

Kuroda, P.K., Sheng, Z.Z., **Anomalous xenon isotopes in the antarctic carbonaceous chondrite Belgica**, *Geochemical journal*, 1986 20(5), p.213-226, Refs. p.225-226.

Anomalies observed by Nagao *et al.* (1984) in the xenon fractions released from the carbonaceous chondrite Belgica can be explained as due to the alterations of the isotopic composition caused by a combined effect of mass-fractionation, high-energy proton spallation, and secondary neutron-capture processes, which occurred within the solar system when the sun was in its *T-Tauri* phase. The isotopic composition of the xenon fraction released from this meteorite at 1,800 C seems to represent that of the xenon which is more primordial than the atmospheric xenon. (Auth.)

E-47856

Yu, S.S., Green, W.J., Nixon, P.A., **Trace metals in Vanda Lake in Antarctica**, *Science in China—Series B*, Nov. 1992 35(11), p.1397-1408, 7 refs.

Vanda Lake, a typical dimictic CaCl₂ type salt lake, is located in the Wright Valley. Based on the chemical and physical features of the salt lake water, the authors discuss the vertical geochemical distribution of Fe, Mn, Pb, Cr, Cu, Co, Ni, and Cd in the lake, and their

vertical migration in lake waters. They attempt to develop model of vertical migration of these trace elements in the water of a closed chloride type salt lake. (Auth.)

E-47876

Spigel, R.H., Forne, I., Sheppard, I., Priscu, J.C., **Differences in temperature and conductivity between the east and west lobes of Lake Bonney: evidence for circulation within and between lobes**, *Antarctic journal of the United States*, 1991 26(5), p.221-222, 3 refs.

Profiles of temperature and conductivity were made along a transect of 13 sampling sites in Lake Bonney during Nov. 1990 and Jan. 1991. Measurements were made with a SeaBird SBE25 Sealogger designed for through-ice sampling and fitted with both finestructure and microstructure temperature and conductivity sensors. An example of a transect made in Jan. is presented for raw temperature and conductivity finestructure. The transect reveals differences and similarities between the two basins of Lake Bonney and suggests possible mechanisms for circulations within and between basins.

E-47905

Rees, P.M., **Revised interpretations of Mesozoic palaeogeography and volcanic arc evolution in the northern Antarctic Peninsula region**, *Antarctic Science*, Mar. 1993 5(1), p.77-84, Refs. p.83-84.

Terrestrial sedimentary rocks at Hope Bay are well known for their diverse but poorly-preserved fossil flora, previously assigned ages ranging from Early Jurassic to Early Cretaceous. The beds form part of the Botany Bay Group, which comprises several outcrops of terrestrial sediments in northern Graham Land and the South Orkney Is. A latest Jurassic or earliest Cretaceous age for the Hope Bay plant-bearing sequence (and by extension for the rest of the Botany Bay Group) has been adopted in most recent publications dealing with Mesozoic volcanic arc evolution and palaeogeography of the northern Antarctic Peninsula region. New evidence, based upon the study of extensive collections of previously undescribed fossil plants from Hope Bay and nearby Botany Bay, indicates that they should be assigned an Early Jurassic age. The new palaeobotanical findings, combined with recently-published radiometric data from overlying volcanic sequences, show that a Cretaceous age is no longer tenable for these floras nor, therefore, for the Botany Bay Group in Graham Land. Interpretations of Mesozoic volcanic arc evolution and palaeogeography in this region are revised accordingly. (Auth.)

E-47906

Sheraton, J.W., Tingey, R.J., Black, L.P., Oliver, R.L., **Geology of the Bunger Hills area, Antarctica: implications for Gondwana correlations**, *Antarctic Science*, Mar. 1993 5(1), p.85-102, Refs. p.101-102.

The Bunger Hills area of the East Antarctic Shield consists of granulite-facies felsic orthogneiss, with subordinate paragneiss and mafic granulite. The igneous precursors of granodioritic orthogneiss were emplaced 1500-1700 Ma, and late Archaean (2640 Ma) tonalitic orthogneiss occurs in the nearby Obruchev Hills. Peak metamorphism (at about 750-800 C and 5-6 kb) occurred 1190 Ma (U-Pb zircon age), and was accompanied by the first of three ductile deformations. Emplacement of voluminous, mainly mantle-derived plutonic rocks, ranging from gabbro through quartz monzogabbro and quartz monzodiorite to granite, followed between 1170 and 1150 Ma. Intrusion of abundant dolerite dykes of four chemically distinct suites at about 1140 Ma was associated with shear zone formation, indicating at least limited uplift; all subsequent deformation was of brittle-ductile type. Alkaline mafic dykes were emplaced 500 Ma. Marked geochronological similarities with the Albany Mobile Belt of Western Australia suggest that high-grade metamorphism occurred during collision between the Archaean Yilgarn Craton of Australia and the East Antarctic Shield about 1200 Ma. (Auth.)

E-47907

Ricci, C.A., Hervé, F., Krynauw, J.R., Lemasurier, W.E., **Naming of igneous and metamorphic rock units in Antarctica: recommendation by the SCAR Working Group on Geology**, *Antarctic Science*, Mar. 1993 5(1), p.103-104, 5 refs.

Geologists from different nations are familiar with different standards and codes of nomenclature, which has resulted in a number of inconsistencies in antarctic stratigraphical names. An *ad hoc* group of the SCAR Working Group on Geology for naming igneous and metamorphic rock units, constituted by the authors of this note, was therefore established to consider and discuss these problems and to formulate recommendations for suitable schemes that may be used internationally for Antarctica. The recommendation by the Working Group was formally accepted by SCAR XXII in Bariloche, Argentina, in June 1992. The full text of the recommendation is given.

E-47908

Smellie, J.L., **Preliminary lithofacies assessment and Ar-40/Ar-39 ages of Cenozoic volcanic sequences in eastern Marie Byrd Land**, *Antarctic Science*, Mar. 1993 5(1), p.105-106, 6 refs.

Because of its remoteness, Marie Byrd Land is among the most inaccessible and least visited parts of Antarctica. It contains a very poorly studied, large Cenozoic alkaline volcanic province and an outstanding record of volcanism coeval with glaciation. This short note describes the results of the second of two planned periods of fieldwork, which form part of the West Antarctic Volcano Exploration (WAVE) project. The background to WAVE and preliminary results of the 1989-1990 fieldwork are described in Smellie *et al.* (1990) and McIntosh *et al.* (1990). The studies described here took place between Nov. 2, 1990 and Jan. 11, 1991. (Auth.)

E-47912

Birkenmajer, K., Dudziak, J., **Nannoplankton evidence for Tertiary sedimentary basement of the Deception Island volcano, West Antarctica**, *Polish Academy of Sciences. Bulletin. Earth sciences*, 1991 39(1), p.93-100, 23 refs.

Volcaniclastic products at Whalers Bay, Deception I. volcano yielded fragments of bentonitic claystones, tuffites and palagonitic tuff with poorly preserved Tertiary coccoliths (discoasters). They indicate an Eocene age of these sediments which were derived from a sedimentary platform under the volcano. (Auth.)

E-47932

Taviani, M., Reid, D.E., Anderson, J.B., **Skeletal and isotopic composition and paleoclimatic significance of Late Pleistocene carbonates, Ross Sea, Antarctica**, *Journal of sedimentary petrology*, Jan. 1993 63(1), p.84-90, 47 refs.

Carbonates cover an extensive area of the northwestern Ross Sea continental shelf. Radiocarbon dates yield late Pleistocene (Stage 3) ages for these deposits, hence the carbonates appear to be correlative with widespread tills and glacial marine deposits in the region. Four carbonate facies are recognized on the basis of skeletal composition: a barnacle/foraminifer facies, a muddy bryozoan facies, a bryozoan/-barnacle/pelecypod/foraminifer facies, and a planktonic foraminiferal facies. These deposits occur on the shelf and upper slope, while carbonate turbidites derived from them occur on the adjacent continental slope and rise. Compositional analyses of Ross Sea carbonates lend support to previously recognized criteria for identifying cold water carbonates. These include: 1) the presence of an associated ice-rafted component (including dropstones); 2) dominance of calcite relative to other carbonate minerals (the remaining fraction consists solely of aragonite); 3) allochems that are entirely skeletal; and 4) heavy oxygen isotopic compositions. (Auth.)

E-47962

Barbu, E.M., ed, **Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau**, College Station, TX, Texas A and M University, 1992, 448p., Refs. passim. For individual papers see E-47963 through E-47986.

DLC QE39.T49b

This volume presents results from the Ocean Drilling Program (ODP), where scientists use a specially equipped ocean drilling ship to sample and measure the properties of the submerged part of the Earth's crust. Twenty four papers are presented, grouped into the following sections: petrology, geochemistry, and paleomagnetism of basement rocks; sedimentology and physical properties of sediments; magnetostratigraphy and paleomagnetism of sedimentary rocks; and paleontology, biostratigraphy, and paleoenvironment of Mesozoic rocks.

E-47963

Schlich, R., Wise, S.W., Jr., **Geologic and tectonic evolution of the Kerguelen Plateau: an introduction of the scientific results of Leg 120**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.5-30, Refs. p.28-30.

DLC QE39.T49b

The goal of this paper is to introduce the Leg 120 *Scientific results* volume and to guide the reader to the individual papers and syntheses contained therein. It provides background information on the Kerguelen Plateau, summaries of the objectives for each of the five sites drilled, preliminary drilling results as given in the *Initial Reports* volume, highlights of the preliminary results, and, where sufficient material was recovered, brief developmental histories for each site. Where these preliminary results have been modified or expanded during subsequent shore-based studies, appropriate references are given to the more detailed single- and multi-authored chapters that follow in this volume. (Auth. mod.)

E-47964

Storey, M., **Lower Cretaceous volcanic rocks on continental margins and their relationship to the Kerguelen Plateau**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.33-53, Refs. p.45-47.

DLC QE39.T49b

Widespread Lower Cretaceous magmatism occurred along the Indian-Australian/antarctic margins and in the juvenile Indian Ocean during the rifting of eastern Gondwana. The formation of this magmatic province probably began around 120-130 Ma with the eruption of basalts on the Naturaliste Plateau and at Bunbury, western Australia. On the northeast margin of India, activity began around 117 Ma with the Rajmahal continental basalts and associated lamprophyre intrusions. The formation of the Kerguelen Plateau in the Indian Ocean began no later than 114 Ma. Ultramafic lamprophyres (alnoites) were emplaced in the Prince Charles Mountains near the antarctic continental margin about 110 Ma. These events are considered to be related to a major mantle plume, the remnant of which is situated beneath the region of Kerguelen and Heard islands at the present day. Geochemical data are presented for each of these volcanic suites, and are indicative of complex interactions between asthenosphere-derived magmas and the continental lithosphere. Kerguelen Plateau basalts have Sr and Nd isotopic compositions lying outside the field for Indian Ocean mid-ocean ridge basalts (MORB) but, with the exception of Site 738 at the southern end of the plateau, within the range of more recent hotspot basalts from Kerguelen and Heard islands. (Auth. mod.)

E-47965

Salter, V.J.M., Storey, M., Sevigny, J.H., Whitechurch, H., **Trace element and isotopic characteristics of Kerguelen-Heard Plateau basalts**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.55-62, Refs. p.61-62.

DLC QE39.T49b

During Leg 120, basalts were recovered at four drill holes on the Kerguelen-Heard Plateau. This paper reports the trace element and Sr, Nd, Hf, and Pb isotopic characteristics of these basalts and compares them with Indian Ocean basalts and Kerguelen and Heard island volcanics. Kerguelen-Heard Plateau basalts are extremely heterogeneous in character. Intersite variations are larger than intrasite variations. Part of the chemical variations of the plateau volcanics overlap with those characteristic of Kerguelen I. volcanics, which indicates tapping of the same mantle source during the two different periods of activity. The estimates of the degree of melting for the plateau basalts (smaller degree of melting than for mid-ocean ridge basalts) and the heterogeneous character of the plateau exclude an origin that requires large degrees of melting or more rigorous convection than at ocean ridges. However, all characteristics indicate an oceanic origin for the Kerguelen-Heard Plateau. (Auth.)

E-47966

Sevigny, J.H., Whitechurch, H., Storey, M., Salter, V.J.M., **Zeolite-facies metamorphism of central Kerguelen Plateau basalts**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.63-69, 19 refs.

DLC QE39.T49b

Ocean Drilling Program Leg 120 recovered basement samples of zeolite-facies metabasalts at Sites 747, 749, and 750 on the Kerguelen Plateau. These basalts were metamorphosed in the low to intermediate zones of the zeolite facies, as indicated by the presence of diagnostic zeolites and the absence of chlorite, epidote, prehnite, pumpellyite, and wairakite. Chabazite, natrolite, thompsonite, mesolite, stilbite, hualandite, and smectites occur as amygduloidal fillings in basalts from Holes 747C and 750B, whereas only stilbite, laumontite, and pure and mixed-layered smectites were identified in amygduloidal basalts from Hole 749C. In the lower sections of Hole 749C, only laumontite and mixed-layered smectites coexist. Based on calculations with published experimental phase equilibria, the absence of wairakite in basalts from Hole 749C and of laumontite in basalts from Holes 747C and 750B suggests that metamorphic temperatures did not exceed approximately 225 and 120 C, respectively. Low- to intermediate-zone zeolite-facies mineral assemblages in basalts from the Kerguelen Plateau can be accounted for by metamorphism in an active geothermal area such as present-day Iceland. (Auth. mod.)

E-47967

Whitechurch, H., **K-Ar and Ar-40/Ar-39 ages of central Kerguelen Plateau basalts**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.71-77, 40 refs.

DLC QE39.T49b

Conventional K-Ar and Ar-40/Ar-39 analyses on whole-rock samples are reported for basaltic samples retrieved on the central and southern Kerguelen Plateau during Ocean Drilling Program Leg 120. The freshest core basalts from the basement yielded dates falling in the 110-100 m.y. interval. Inspection of the Ar-39/Ar-40 vs. Ar-36/Ar-40 diagram does not reveal the occurrence of an initial argon component of radiogenic composition in the two samples. Accordingly, results suggest that the formation of the basement of the central Kerg-

uelen Plateau was closed at 110 m.y. Furthermore, these results are in agreement with a K-Ar age of 114 m.y. mentioned in the literature for a basalt dredged in the 77E Graben. The still scant amount of data indicates that the outpourings of the central Kerguelen Plateau correspond rather well with widespread continental magmatism in Gondwanaland that is believed to mark the incipient opening of the eastern Indian Ocean. This implies a huge head for the mantle plume at the source of these liquids. Nevertheless, on land and at sea the exact duration of magmatism remains unknown. Therefore, a catastrophic pattern similar to that currently invoked for the Deccan Traps at the end of the Cretaceous, though possible, is not yet required by present geochronologic data. (Auth. mod.)

E-47968

Heider, F., Geiss, C., Dunlop, D.J., Inokuchi, H., **Rock-magnetic investigation of basalt from the southern Kerguelen Plateau (Leg 120)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.79-87, 22 refs.

DLC QE39.T49b

Basalt samples recovered on Ocean Drilling Program Leg 120 from the Kerguelen Plateau were investigated by thermomagnetic analysis, X-ray diffraction, and ore microscopy. The basement samples could be divided into two groups based on Curie temperatures, cell-edge parameters, and optical magnetic mineralogy. Samples from Sites 748 and 750 underwent only low-temperature oxidation and displayed Curie temperatures for the titanomaghemites that ranged from 340 to 395 C. The basalts from Sites 747 and 749 mainly experienced high-temperature oxidation. High-temperature oxidation produced titanium-poor titanomagnetites with ilmenite-exsolution lamellae. Curie temperatures of the deuterically oxidized titanomaghemites varied from 490 to 620 C. (Auth.)

E-47969

Inokuchi, H., Heider, F., **Paleolatitude of the southern Kerguelen Plateau inferred from the paleomagnetic study of Upper Cretaceous basalts**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.89-96, 23 refs.

DLC QE39.T49b

Paleomagnetic measurements were performed on 106 basalt samples collected from Holes 747C, 748C, 749C, and 750B. Basalt samples were recovered from the southern portion of the Kerguelen Plateau and the transitional zone between the northern and southern plateau in the south central Indian Ocean. The ages of basalts range from 100 to 115 Ma. Reliable paleomagnetic results were obtained from three sites (Sites 747, 748, and 749). The paleomagnetic inclinations of Sites 747, 748, and 749 are -51 deg, -63 deg, and -62 deg, respectively. The considerable differences between the paleomagnetic and present inclinations of about 70 deg at Sites 747, 748, and 749 indicate that displacement in the direction of the geomagnetic meridian has taken place since formation of the basalt. Shallower paleomagnetic inclinations than the present inclinations at each site imply a southward movement of the sites with respect to the geomagnetic pole. By comparing the apparent polar wander path of Antarctica with the virtual geomagnetic pole (VGP) of the southern Kerguelen Plateau, it is concluded that no major tectonic movement has taken place between the Kerguelen Plateau and Antarctica since formation of the basalt (i.e., 100-115 Ma). The angular dispersion of the VGP for the Kerguelen Plateau is calculated as 17 deg. (Auth. mod.)

E-47970

Holmes, M.A., **Cretaceous subtropical weathering followed by cooling at 60S latitude: the mineral composition of southern Kerguelen Plateau sediment, Leg 120**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.99-111, Refs. p.108-109.

DLC QE39.T49b

Kaolinite, goethite, minor hematite, and gibbsite were found in fluvial upper Lower Cretaceous basal sediment from the southern Kerguelen Plateau. This mineral assemblage, derived from the weathering of basalt, indicates near-tropical weathering conditions with high orographic rainfall, at least 100 cm per year. The climate deteriorated by the Turonian or Coniacian, as indicated by the decline in kaolinite content of this sediment. The Upper Cretaceous sediment at Site 748 consists of 200 m of millimeter-laminated, sparsely fossiliferous, wood-bearing glauconitic siltstone and claystone with siderite concretions deposited on a shelf below wave base. Some graded and cross beds indicate that storms swept over the shelf and reworked the sediment. Overlying this unit is 300 m of intermittently partly silicified, bryozoan-inoceramid-echinoderm-rich glauconitic packstones, grainstones, and wackestones. The dominant clay mineral in both units is identical to the mineral composition of the glauconite pellets: randomly interstratified smectite-mica. The clay fraction has a higher percent of expandable layers than the mineral of the glauconite pellets, and the clay of the underlying subunit has a higher percentage of expandable layers than the clay of the carbonate subunit. Potassium levels mirror these mineral variations, with higher K levels in minerals that have a lower percentage of expandable layers. The decrease in expandability of the mineral in the upper subunit is attributed to diagenesis, the result of higher porosity. (Auth.)

E-47971

Bitschene, P.R., Holmes, M.A., Breza, J.R., **Composition and origin of Cr-rich glauconitic sediments from the southern Kerguelen Plateau (Site 748)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.113-134, Refs. p.130-132.

DLC QE39.T49b

Five hundred meters of a unique Upper Cretaceous Cr-rich glauconitic sequence (Unit III) that overlies a 3 m-thick alkali-basalt flow with underlying epiclastic volcanogenic sediments was drilled at ODP Leg 120 Site 748. The Cr-rich glauconitic sequence is lithostratigraphically and biostratigraphically divided into three subunits (IIIA, IIIB, IIIC) that can also be recognized by the Cr concentration of the bulk sediment, which is low (<200 ppm) in Subunits IIIC and IIIA and high (400-800 ppm) in Subunit IIIB. The Cr enrichment is caused by Cr-spinel, which is the only significant heavy mineral component beside Fe-Ti ores. Other Cr-bearing components are glauconite pellets and possibly some other clay minerals. The glauconitic sequence of Subunit IIIB was formed by reworking of glauconite and volcanogenic components that were transported restricted distances and redeposited downslope by mass-transportation processes. The volcanic edifices uncovered on land were tholeiitic basalts (T-MORB), alkali-basaltic (OIB) and (?)silicic volcanic complexes, and ultramafic rocks. The latter were the ultimate source for the Cr-spinel contribution. The Upper Cretaceous glauconitic sequence at Site 748 on the southern Kerguelen Plateau constitutes the transition in space and time from terrestrial to marine, from magmatically active subaerial to magmatically passive submarine conditions, and from a tranquil platform to active rifting conditions. (Auth. mod.)

E-47972

Bitschene, P.R., Mehl, K.W., Schmincke, H.U., **Composition and origin of marine ash layers and epiclastic rocks from the Kerguelen Plateau, southern Indian Ocean (Legs 119 and 120)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.135-149, 24 refs.

DLC QE39.T49b

Epiclastic volcanogenic rocks recovered from the Kerguelen Plateau comprise (pre-)Cenomanian(?) claystones (52 m thick, Site 750); a Turonian(?) basaltic pebble conglomerate (1.2 m thick, Site 748); Danian mass flows (45 m thick, Site 747); and volcanogenic debris flows of Quaternary age at Site 736. Pyroclastic rocks comprise numerous Oligocene to Quaternary marine ash layers. The epiclastic sediments with transitional mid-ocean-ridge basalt (T-MORB) origin indicate weathering (Site 750) and erosion (Site 747) of Early Cretaceous T-MORB from a then-emergent Kerguelen Plateau, connected to Late Cretaceous tectonic events. The basal pebble conglomerate of Site 748 has an oceanic-island basalt (OIB) composition and denotes erosion and reworking of seamount to oceanic-island-type volcanic sources. The ash layers resulted from highly explosive eruptions on Kerguelen and, with less probability, Heard islands since the Oligocene. The explosive history starts with widespread Oligocene basaltic ash layers that indicate sea-level or subaerial volcanism on the northern Kerguelen Plateau. After a hiatus of 24 m.y.(?), explosive magmatic activity is inferred for the Pliocene-Pleistocene. The composition and evolution of Kerguelen Plateau ash layers resemble those from other hotspot-induced oceanic-island realms such as Iceland and Jan Mayen in the North Atlantic, and the Canary Is. archipelago in the central Atlantic. (Auth. mod.)

E-47973

Morche, W., Hubberten, H.W., Mackensen, A., Keller, J., **Geochemistry of Cenozoic ash layers from the Kerguelen Plateau (Leg 120): a first step toward a tephrostratigraphy of the southern Indian Ocean**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.151-160, 25 refs.

DLC QE39.T49b

Geochemical investigations were conducted on 10 discrete ash layers and 22 samples of dispersed ash accumulations from Sites 747, 749, and 751 of Ocean Drilling Program Leg 120 to the Kerguelen Plateau. The chemical data obtained from some 400 single-grain glass analyses allow the characterization of two rock series. The first consists of transitional to alkali basalts; the second mainly of trachytes with subordinated rhyolites, all reflecting the characteristic magmatological evolution of the Kerguelen Plateau as a hotspot-related volcanism. Chemical correlation with possible source areas indicates that the ashes were most probably erupted from the Kerguelen Is. Pleistocene tephras of "exotic" calc-alkaline composition are most probably derived from enhanced magmatic activity during that time span at the South Sandwich I. arc. When one uses data obtained from tephras of the Leg 119 Kerguelen sites, several eruptive periods can be correlated through the composition of the deposited ashes. Some of them are widely distributed over the Kerguelen Plateau and are seen as a first step toward a southern Indian Ocean tephrostratigraphy. (Auth. mod.)

E-47974

Breza, J.R., Wise, S.W., Jr., **Lower Oligocene ice-rafted debris on the Kerguelen Plateau: evidence for east antarctic continental glaciation**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.161-178, Refs. p.176-178.

DLC QE39.T49b

Appreciable lower Oligocene clastic detritus interpreted to be ice-rafted debris (IRD) was recovered at Ocean Drilling Program Site 748 on the central Kerguelen Plateau. The IRD occurs between 115.45 and 115.77 mbsf within a stratum of siliceous nannofossil ooze in an Oligocene sequence otherwise composed exclusively of nannofossil ooze with foraminifers and siliceous debris. Glauconite and fish skeletal debris (ichthyolith fragments) occur in association with the IRD. According to planktonic foraminifer, diatom, and nannofossil biostratigraphy and magnetostratigraphy, the IRD interval is earliest Oligocene in age (35.8-36.0 Ma). The sedimentation rate throughout this interval was rather low (approximately 6.3 m/m.y.). The direct physical evidence of lower Oligocene IRD this far north of the antarctic continent (the lowest latitudinal occurrence known) and the association of the IRD with the globally recognized shift in $\delta_{18}O$ argue strongly for the presence of an earliest Oligocene ice sheet on the antarctic continental. (Auth. mod.)

E-47975

Rack, F.R., Palmer-Julson, A., **Sediment microfabric and physical properties record of Late Neogene Polar Front migration, Site 751**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.179-205, Refs. p.194-195.

DLC QE39.T49b

Through scanning electron microscope analysis of sediment microfabric, the authors have evaluated variations in high-resolution shipboard physical properties (index properties and shear strength), sediment components (smear slide determinations), and shore-based calcium carbonate and biogenic silica data from Site 751 (Kerguelen Plateau). The stratigraphic section at this site records a change in biogenic ooze composition from predominantly calcareous (nannofossil) to siliceous (diatom) ooze from 23 Ma to the present, reflecting expansion of antarctic water masses during the Late Neogene. The profound change in physical properties and sediment character at 40.1 mbsf (5-6 Ma) evidently records the northward movement of the Polar Front and a change in absolute accumulation rates of sediment at this site. The study of the sedimentary microfabric indicates that randomly oriented, elongate pennate diatom valves compose the sediments with highest porosity and water content values, and the lowest density values (wet bulk, dry bulk, and grain density). Conversely, sediments composed of nannofossils and disassociated nannofossil crystallites and little or no siliceous remains have the lowest porosity and water content values, and the highest density values. Samples of mixed siliceous/calcareous composition have intermediate physical property values, but these vary according to the nature of the sedimentary matrix and the state of preservation of individual skeletal elements. (Auth. mod.)

E-47976

Breza, J.R., **High-resolution study of Neogene ice-rafted debris, Site 751, southern Kerguelen Plateau**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.207-221, 30 refs.

DLC QE39.T49b

High-resolution sampling at Site 751 was used to delineate in detail the Neogene ice-rafted debris (IRD) occurrences on the Kerguelen Plateau. The oldest IRD found at Site 751 was approximately 9.9 Ma, and it was not until approximately 8.5 Ma that significant concentrations of IRD were detected. The first major IRD event at this site occurred in the uppermost Miocene between 6.0 and 5.5 Ma. During this time period, a general climatic cooling and glacial expansion occurred in Antarctica. The late Miocene IRD event was followed by a continuous episode of elevated IRD deposition in the lowermost Pliocene between 4.5 and 4.1 Ma. The 0.4 m.y. duration and the timing of the early Pliocene IRD event on the Kerguelen Plateau corresponds with IRD fluxes observed on the Falkland Plateau and in the Weddell Abyssal Plain. This correspondence of data indicates that a major global climatic event occurred during the early Pliocene. The East Antarctic Ice Sheet may have experienced deglaciation between 4.5 and 4.1 Ma, and as a result released large volumes of sediment-laden ice into the southern ocean. (Auth. mod.)

E-47977

Heider, F., Leitner, B., Inokuchi, H., **High southern latitude magnetostratigraphy and rock magnetic properties of sediments from Sites 747, 749, and 751**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.225-245, 20 refs.

DLC QE39.T49b

The magnetostratigraphy of Sites 747, 749, and 751 of Leg 120 that was established by shipboard measurements was extended and confirmed. Five hundred and eighty sediment cubes were stepwise demagnetized with alternating fields to determine their characteristic remanence. A rather complete magnetostratigraphy from the Oligocene to the Pliocene was obtained for the nannofossil oozes of Site 747. Alternating-field demagnetization experiments on laboratory-induced magnetization, hysteresis measurements, and low-temperature experiments showed that the magnetic carriers are single-domain and small pseudo-single-domain (titano) magnetite particles. A fraction of these Fe-Ti oxides seems to reside as microlites in the vitric volcanic ash particles that were enriched in the magnetic separates. The natural remanent magnetizations seem to be of detrital origin with small Fe-Ti oxide grains in the volcanic glass particles as carriers of the stable paleomagnetic signal. (Auth.)

E-47978

Inokuchi, H., Heider, F., **Magnetostratigraphy of sediments from Sites 748 and 750, Leg 120**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.247-252, 4 refs.

DLC QE39.T49b

The magnetostratigraphy of Sites 748 and 750 of Ocean Drilling Program Leg 120 is reported. About 260 sediment cubes were stepwise demagnetized with alternating fields to determine their characteristic direction of natural remanent magnetization. In general, the characteristic inclinations of the single samples have values similar to the inclination values obtained from whole-core measurements at the nearest depth. The preliminary magnetostratigraphy of Sites 748 and 750, which had been reported based on shipboard measurements, was confirmed and extended. A rather complete magnetostratigraphic record from the middle Eocene to the Pliocene was obtained from Site 748. (Auth.)

E-47979

Mohr, B.A.R., Gee, C.T., **Early Albian palynoflora from the Kerguelen Plateau, southern Indian Ocean (Leg 120)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.255-271, Refs. p.263-265.

DLC QE39.T49b

A well-preserved, diverse sporomorph flora of over 60 species has been found in Cores 120-750B-12W through -14R from the southern Kerguelen Plateau. Analysis of the flora indicates that the terrestrial sediments overlaying the basaltic basement are late Early Cretaceous in age. Ranges of the sporomorphs in other parts of Gondwana and the morphology and paucity of angiosperm pollen grains confine the age of this section to the early to possibly early middle Albian. The Albian palynomorph assemblages in Hole 750B are composed primarily of fern spores and podocarpaceous pollen, and show most similarity to those from southern Australia. Changes in the flora through time reflect the successful vegetation changes on barren volcanic islands, beginning with high percentages of colonizing ferns and maturing into conifer (podocarp) forests. The flora shows some signs of endemism, which may be a result of the isolated position of the Kerguelen Is. during the Early Cretaceous. This endemism is expressed by high percentages of a distinctive monosulcate pollen species *Ashmoripollis woodywisei* n.sp. of pteridosperm or cycadophycean origin, and a thick-walled monosulcate angiosperm pollen species of the genus *Clavatipollenites*. The climatic conditions were probably cool to temperate (mean annual temperature approximately 7-12 C) and humid (annual rainfall > 1000 mm), analogous to modern *Podocarpus*-dominated forests in New Zealand and in South American mountain regions. (Auth.)

E-47980

Francis, J.E., Coffin, M.F., **Cretaceous fossil wood from the Raggatt Basin, southern Kerguelen Plateau (Site 750)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.273-280, 23 refs.

DLC QE39.T49b

Lower Cretaceous volcanoclastic sediments from Ocean Drilling Program Leg 120, Site 750, from the eastern flank of the Raggatt Basin on the Kerguelen Plateau, contain small clasts of fossil wood. Some wood is preserved as charcoal and has excellent structural preservation, whereas other wood is preserved as vitrinite with poor structure. All the wood examined is from conifer trees and is identified as *Podocarpoxylon*, wood similar to that of the living podocarps, and a type common in antarctic and other Gondwanan Cretaceous floras. The presence of wood suggests that forested land was situated near the Raggatt Basin during the Early Cretaceous. Some wood was charred by burning in forest fires, possibly caused by volcanic eruptions. The charcoal and some unburnt wood was then buried in adjacent (probably nonmarine) sediments. This report provides an additional record of forest vegetation in high-latitude sites during the Cretaceous. (Auth.)

E-47981

Mohr, B.A.R., Gee, C.T., **Late Cretaceous palynofloras (sporomorphs and dinocysts) from the Kerguelen Plateau, southern Indian Ocean (Sites 748 and 750)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.281-306, 46 refs.

DLC QE39.T49b

Pollen, spore, and dinoflagellate cyst floras of Late Cretaceous age were found at Sites 748 (120-748C-62R through -79R) and 750

(120-750B-11W) of Ocean Drilling Program Leg 120 in the Kerguelen Plateau area. The ranges of dinocyst and sporomorph species indicate ages between the Cenomanian and Coniacian (to possibly the early Santonian). The ratio of marine/terrestrial flora elements is extremely variable, showing a trend from highly terrestrial (up to 70%) in the late Cenomanian to highly marine (up to 90%) in the Coniacian/early Santonian. Low sedimentation rates of about 3-5 cm/1000 yr were calculated for the glauconitic sediments of Turonian and Coniacian age at Site 748 (lithologic Subunit IIIB). (Auth.)

E-47982

Mao, S.Z., Mohr, B.A.R., **Late Cretaceous dinoflagellate cysts (?Santonian-Maestrichtian) from the southern Indian Ocean (Hole 748C)**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.307-341, Refs. p.320-322.

DLC QE39.T49b

At Ocean Drilling Program Hole 748C in the southern Indian Ocean, a total of 171 Late Cretaceous dinoflagellate taxa were encountered in 38 productive samples. The dinocyst assemblages bear a strong affinity to Australian assemblages. Paleoenvironmental interpretations based mainly on dinocysts suggest that during the ?Santonian-Campanian to the Maestrichtian this portion of the Kerguelen Plateau was a shallow submerged plateau, similar to nearshore to offshore to upper slope environments with water depths of tens to hundreds of meters, but isolated from the major continents of the Southern Hemisphere. The studied dinocyst assemblages characterized by species of *Amphidiadema*, *Nelsoniella*, *Satyrodinium*, and *Xenikoon* together with abundant *Chatangiella* (the large-size species) and *Isabelidinium* suggest that a South Indian Province (tentatively named the Helby suite) may have existed during the Campanian-Maestrichtian in comparison with the other four provinces of Lentin and Williams. One new genus, three new species, and two new subspecies of dinocysts are described. (Auth. mod.)

E-47983

Watkins, D.K., **Upper Cretaceous nannofossils from Leg 120, Kerguelen Plateau, southern ocean**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.343-370, Refs. p.363-364.

DLC QE39.T49b

Drilling on the Kerguelen Plateau during Leg 120 cored the most complete, best preserved record of the Late Cretaceous of the southern ocean to date. Two calcareous pelagic sedimentary sections provide a record from the upper Turonian(?) - lower Coniacian through the Maestrichtian. Two major disconformities interrupt the record: upper Coniacian-lower Santonian and mid-Campanian. Site 748 contains a Campanian-Maestrichtian record of neritic sedimentation dominated by nannofossil-bearing, intermittently silicified glauconitic bioclastic grainstones to wackestones. Parts of the upper Maestrichtian and the mid-Campanian are absent at this site. A set of 21 biostratigraphic events were used to correlate these sections. This combination of cosmopolitan and austral events allowed local, regional, and global correlation. Correlation of this scheme from the pelagic sites to the neritic site indicates the applicability of this system to the sparse, restricted assemblages of the upper Campanian and lower Maestrichtian. Comparison of the Kerguelen assemblages with previous records indicates weak provincialism and little endemism in the Coniacian through early Campanian southern ocean. A new species, *Zeughrabdotus kerguelenensis*, is named. (Auth. mod.)

E-47984

Quilty, P.G., **Upper Cretaceous planktonic foraminifers and biostratigraphy, Leg 120, southern Kerguelen Plateau**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.371-392, Refs. p.385-386.

DLC QE39.T49b

Ocean Drilling Program Leg 120 Sites 747, 750, and Hole 748C on the southern Kerguelen Plateau contain Cretaceous marine sections that span the Upper Cenomanian-Upper Maestrichtian. The most complete sections recovered from Sites 747 and 750 are Campanian and Maestrichtian. Older sections are fragmentary, and only spot ages and paleotemperature indications can be determined. The section in Hole 748C lacks age-diagnostic planktonic species, and was deposited under very shallow marine conditions. Water temperature was temperate (perhaps in the Transitional Faunal Province in Sliter's sense) with keeled globotruncanids present through the Cenomanian-Santonian. Faunas in the upper Campanian and into the *Abathomphalus mayaroensis* Zone of the upper Maestrichtian may be placed in the Austral Faunal Province. In the upper part of the *A. mayaroensis* Zone, temperatures were significantly higher, with quite diverse globotruncanids and more complex biserial taxa at the location of Site 750. Waters at Site 750, to the south and east of Site 747, may have been warmer during the Upper Cretaceous, reflecting the presence of a counterclockwise gyre east of the Kerguelen Plateau. (Auth.)

E-47985

Quilty, P.G., **Upper Cretaceous benthic foraminifers and paleoenvironments, southern Kerguelen Plateau, Indian Ocean**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.393-443, Refs. p.424-427.

DLC QE39.T49b

Over 200 species of benthic foraminifers are recorded from three Ocean Drilling Program sites on the southern Kerguelen Plateau drilled during Leg 120. They represent environments of deposition from neritic to bathyal during the Cenomanian to Maestrichtian. Many species are left in open nomenclature. Analysis of planktonic percentage, dominance/diversity, and comparison of faunal composition and structure shows that at all sites there is strong evidence of deepening water with time. The sediments at Sites 747 and 750 accumulated dominantly in open-ocean conditions of generally bathyal depths, increasing with time. The deepest faunas may represent lower bathyal depths. At Site 748C, deposition began in marine conditions so shallow that there is no foraminiferal component at all and the environment may have been estuarine or salt marsh, in part with reducing conditions. After the Cenomanian/Turonian, conditions became more open marine, but waters were still very shallow so that planktonic percentage remains low. Indexes other than foraminiferal suggest that the Kerguelen Plateau was vegetated through much of the Upper Cretaceous and that there may always have been islands or larger expanses of the plateau surface exposed. (Auth.)

E-47986

Quilty, P.G., **Cretaceous-Tertiary invertebrate macrofaunas, Leg 120, southern Kerguelen Plateau, Indian Ocean**, Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau, edited by E.M.Barbu, College Station, TX, Texas A and M University, 1992, p.445-448, 2 refs.

DLC QE39.T49b

Bivalves, calcareous worm tubes, and an irregular echinoid are described and illustrated from Cenomanian/Turonian, upper Campanian, and middle to upper Eocene sediments recovered from several holes penetrated by Ocean Drilling Program Leg 120 drilling. Envi-

ronments represented include deep-sea oozes and inner-continental shelf depths. All fossils are identified to genus but are left in open nomenclature at the specific level. The occurrence of *Pycnodonte* (*Crenostrea*) sp., an oyster, in deep-sea sediments seems unusual. (Auth.)

E-47988

Cassidy, W.A., Schutt, J.W., **Antarctic search for meteorites, 1990-1991 field season, *Antarctic journal of the United States*, 1991 26(5), p.52-53, 6 refs.**

Details are provided of the meteorite collecting activities of this two-team group which was in the field between Nov. 30, 1990 and Jan. 21, 1991. Collecting areas included Lewis Cliff, Elephant Moraine, "Texas Bowl," and Goodwin Nunataks, all in the general region of the Allan Hills/David Glacier. An apparent boundary was discovered in a color change from blue to yellow in the ice of the upper Lewis Cliff ice tongue. Two handheld global positioning devices were operated: used individually they were precise to within 10 m; used together, to within 5 m. Using the pair, accurate positioning could be completed while a specimen was being field catalogued.

E-47989

Benoit, P.H., Sears, D.W.G., Sears, H., Roth, J., **Natural thermoluminescence of meteorites and paleo-ice movement at the Lewis Cliff blue ice field, *Antarctic journal of the United States*, 1991 26(5), p.53-55, 12 refs.**

The laboratory has been measuring the natural thermoluminescence levels of many meteorites as part of an effort to identify those that have undergone unusual thermal or radiation histories and to identify "pairings", i.e., fragments that are actually part of a single meteorite. This article reports the detailed analysis of the largely complete collection from the Lewis Cliff ice field and relates the data to possible paleo-ice movements at this site. To date, the natural thermoluminescence levels of more than 700 antarctic meteorites have been measured, including 302 from the Lewis Cliff site, collected during the 1985-1986, 1986-1987, and 1987-1988 field seasons. The data, in conjunction with petrographic descriptions and classifications and geographic data, indicate that the 302 samples represent a maximum of 259 distinct meteorites, i.e., the data show that 70 of the samples can be combined as 27 individual meteorites which fragmented after Earth impact, in addition to 232 samples which do not appear to be so "paired". It is stressed that the pairing criteria used are highly conservative and that there is almost certainly a large amount of unrecognized pairing in the data.

E-47990

Lipschutz, M.E., **Meteorite studies: terrestrial and extraterrestrial applications, 1991, *Antarctic journal of the United States*, 1991 26(5), p.56-57, 11 refs.**

A brief review cites topics of current interest in the field of meteoritics, such as: differences in content and numbers between antarctic and non-antarctic meteorites; understanding the formation of the HED parent body through electron probe analysis; studying parts per million/parts per trillion levels of 12-15 trace elements; results of radiochemical neutron activation; absence of any identifiable alteration due to weathering in any antarctic meteorites; and measurement of cosmogenic radionuclides, among others.

E-47991

Nishiizumi, K., Sharma, P., Kubik, P.W., **Terrestrial ages of antarctic meteorites, *Antarctic journal of the United States*, 1991 26(5), p.57-59, 10 refs.**

The authors provide a histogram of terrestrial ages of Yamato, Allan Hills, and other antarctic meteorites. Pairs of meteorites are shown as one object plotted at the average age. Although the total amount of data is nearly double, the general trend remains the same

as in a previous publication on this subject. Results show that many of the Lewis Cliff meteorites are as old as the Allan Hills meteorites. The histogram of terrestrial ages of Elephant Moraine meteorites shows a smooth exponential decrease with age. Only four meteorites, ALH84243, 85037, 85048, and 85123 were collected on soil or on bedrock at Allan Hills, while ALH85118 was collected from a steeply sloping ice surface. If this meteorite was recently exposed from inside the ice, the age of the ice should be same as the terrestrial age of the meteorite, 650,000 years. The meteorite age, however, is much older than the measured age of ice of the Allan Hills Main Icefield based on uranium-thorium and krypton-81 dating, and the age of ice at Allan Hills Cul de Sac.

E-47992

Langway, C.C., Jr., **Shallow ice core drilling project at Byrd Station, Antarctica, *Antarctic journal of the United States*, 1991 26(5), p.60-61, 7 refs.**

An analysis is given of a 1989 ice core at Byrd Station (NBY-89). One goal of the project was to investigate the surface and near-surface layers using state-of-the-art ice-core study techniques to overlap and extend to the surface paleoenvironmental records obtained from the original deep core drilling completed in 1968. One of the top priorities of this project was to establish a new surface reference horizon at Byrd Station and to correlate the new chronology with the ice-core records from 1968 for Byrd Station for several stratigraphic considerations. The top 300 years of the 1,360 year chronology reflect clear changes in the average concentration levels of isotopic oxygen, methane sulfonate, and nonvolcanic excess sulfate (biogenic). The stable isotope ratios show a warming trend; the methane-sulfonate curve shows a deep negative dip in concentration levels and the nonvolcanic portion of the excess sulfate concentration slightly increases. The excess sulfate concentration peaks indicate past volcanic activity. This is verified by high acidity (hydrogen ion) signals. The volcanic layer chronology established for NBY-89 is stratigraphically connected to the Byrd Station 1968 deep ice core in three ways: by the prominent 1259 AD and other volcanic events; regionally with a new (1978) South Pole 111 m deep core; and globally with four other locations in Greenland.

E-47994

Bentley, C.R., Atre, S.R., Munson, C.G., **Analysis of seismic and gravity studies on the Siple Coast, *Antarctic journal of the United States*, 1991 26(5), p.63-65, 8 refs.**

Accounts of this work on ice stream C were discussed in three papers presented at an American Geophysical Union meeting in Dec. 1990. The papers are summarized here. Some understanding of bed softness was derived from phases of seismic reflections, although a serious, unresolved difficulty arises in the explanation of reversals and non-reversals and ice impedance. Reflection and refraction studies shed some light on seismic anisotropy in the ice. The subglacial crustal structure study showed two layers and provided sufficient data to construct a crustal model of the subsurface profile.

E-48000

Kellogg, T.B., Kellogg, D.E., Stuiver, M., **Radiocarbon dates from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history, *Antarctic journal of the United States*, 1991 26(5), p.77-79, 20 refs.**

During the 1989-1990 field season, carbonate skeletal debris was collected for radiocarbon dating from McMurdo Ice Shelf. Most of the dates presented were obtained from shells of the barnacle *Bathylasma corolliforme* (Hoek), the most abundant and widespread carbonate invertebrate on the McMurdo Ice Shelf. The authors argue that the anchor-ice mechanism is relatively unimportant because it should produce either a pattern of randomly distributed ages, if currents are sporadic or intermittent, or a distinct distribution of ages

related to existing current patterns. The distribution of dates clearly shows that all specimens dated less than 2,000 years ago occur close to shorelines. The second conclusion is related to an interpretation of the carbon-14 dates. The complete absence of dates between 7,750 and 20,000 years ago is consistent with the presence of grounded ice of the late Wisconsin Ross Sea Ice Sheet, which filled McMurdo Sound during this period. The older suite of carbon-14 dates (>20,000 years ago) represents organisms that lived in McMurdo Sound or the adjacent Ross Sea prior to the late Wisconsin advance of grounded ice that filled McMurdo Sound. These dates are considered as minimum ages for preglacial marine conditions.

E-48001

Marchant, D.R., Denton, G.H., **Late Tertiary ice sheet overriding of the western Asgard Range, Antarctica: evidence from Nibelungen Valley, *Antarctic journal of the United States*, 1991 26(5), p.80-82, 9 refs.**

Previous studies cite subglacial channels and potholes, extensive drift sheets, highly dissected unconsolidated deposits, and stoss-and-lee topography to infer northeast glacial overriding of the western Asgard Range. Described here are widespread diamictos, short-traveled gravel deposits, and linear ground-flutes that are consistent with northeast glacial overriding. Preliminary results are based on on-site mapping with low-elevation air photographs and detailed descriptions of 135 soil excavations in central and lower Nibelungen Valley.

E-48002

Brook, E.J., Kurz, M.D., Ackert, R.P., Jr., Denton, G.H., **Chronology of Taylor Glacier advances in Arena Valley using *in situ* produced cosmogenic helium-3, *Antarctic journal of the United States*, 1991 26(5), p.82-85, 8 refs.**

Isotopes produced in rocks by cosmic rays offer a promising new tool for studying exposure histories of geologic surfaces. These techniques are applied in the McMurdo Dry Valleys-McMurdo Sound area of Antarctica with the goal of constraining the glacial history of the region. In the 1989-1990 and 1990-1991 field seasons, numerous samples of glacial moraines and other unconsolidated surface deposits, exposed bedrock, and lava flows were collected. Initial efforts concentrated on measurements of *in situ*-produced cosmogenic helium-3 in samples from an extremely well-exposed sequence of boulder-belt moraines deposited by the Taylor Glacier in lower Arena Valley. Complementary measurements of *in situ*-produced beryllium-10 and aluminum-26 have also been made in a subset of these samples.

E-48003

Kurz, M.D., Brook, E.J., Ackert, R.P., Jr., **Surface-exposure dating of antarctic glacial deposits, *Antarctic journal of the United States*, 1991 26(5), p.85-86, 10 refs.**

Results are reported of cosmogenic nuclide studies in rocks of the McMurdo Dry Valleys. If the production rate of a cosmogenic nuclide is known, measurement of the amount present in the rock can then be used to obtain an exposure age. This technique has particular importance for antarctic glacial geology because direct dating of glacial deposits is critical to understanding past fluctuations in the antarctic ice sheets. The emphasis of this research has been the use of cosmic-ray-produced helium-3, because it is stable, has the highest production rate of any cosmogenic nuclide, and can be measured with a conventional mass spectrometer. Collection efforts have focused on rocks containing quartz and olivine, which are minerals with slow helium-diffusion rates, thus minimizing loss problems. Preliminary studies indicate that some cosmogenic helium is lost from some quartz samples; however, this mineral should be useful for younger samples, and there is no evidence of helium loss from olivine. Samples are collected from top surfaces, or from known depths within the rock, because production rates are depth dependent and are significant only within the top several meters. Several important geological assumptions inherent to the technique are identified.

E-48011

Dickins, J.M., **Permian geology of Gondwana countries: an overview, *International geology review*, Oct. 1992 Vol.34, p.986-1000, 58 refs.**

Earliest Permian sequences of Antarctica, southern and east-central Africa, the southern part of the Arabian Peninsula, Pakistan, peninsular and Himalayan India, Tibet, western and eastern Australia, New Zealand, and South America are all characterized by glacial deposits and cold-water marine faunas. In the course of the Permian, considerable faunal (and floral) and climatic divergence occurred. Although folding is not necessarily present, the effects of the strong compressive tectonic phase (Hunter-Bowen Orogenic Folding Phase of Dickins) beginning in the mid-Permian (traditional two-fold subdivision) and of acidic and intermediate volcano-magmatic activity are apparent in all these regions as in other parts of the world. The progressive continentality of the Upper Permian (worldwide regression) culminates at the Permian-Triassic (Changxingian-Griesbachian) boundary. (Auth.)

E-48018

Mitchell, N.C., Parson, L.M., **Tectonic evolution of the Indian Ocean triple junction, Anomaly 6 to present, *Journal of geophysical research*, Feb. 10, 1993 98(B2), p.1793-1812, Refs. p.1811-1812.**

The tectonic evolution of the Indian Ocean ridge-ridge-ridge triple junction, the junction of the Central Indian Ridge (CIR), Southeast Indian Ridge (SEIR) and Southwest Indian Ridge (SWIR), is inferred by mapping structures along its traces on the three plates with a long-range side scan sonar, Geological LongRange Inclined Asdic (GLORIA). The sonar images to the west of the triple junction show two different styles of tectonic evolution. Some sections of the trace on the African plate are marked by a SWIR-facing scarp containing fine lineaments that are probably normal faults. These correspond with sections of the trace on the antarctic plate of the same age that have a sharp intersection of SWIR and SEIR abyssal hills. In contrast, there are other sections of the trace on the African plate that have a blocky structure with no definite termination of CIR abyssal hills against those of the SWIR. The corresponding regions of the antarctic plate show large 10- to 30 km long overlapping fault scarps, tapering to the northeast and ending in asymmetric valleys to the southwest. If the shape of the rift shoulder uplift along the trace on the antarctic plate is interpreted with a simple flexural model involving an end-loading elastic plate, the inferred rigidity is consistent with the suggestion that the isostatic uplift occurred in young, weak lithosphere, close to the triple junction. (Auth. mod.)

E-48019

Benoit, P.H., Sears, H., Sears, D.W.G., **Natural thermoluminescence of meteorites. 5. Ordinary chondrites at the Allan Hills ice fields, *Journal of geophysical research*, Feb. 10, 1993 98(B2), p.1875-1888, Refs. p.1887-1888.**

Natural thermoluminescence (TL) data have been obtained for 167 ordinary chondrites from the ice fields in the vicinity of the Allan Hills to investigate their thermal and radiation history, pairing, terrestrial age, and concentration mechanisms. Using fairly conservative criteria (including natural and induced TL, find location, and petrographic data), the 167 meteorite fragments are thought to represent a maximum of 129 separate meteorites. Natural TL values for meteorites from the Main ice field are fairly low (typically 5-30 krad, indicative of terrestrial ages of about 400 ka), while the Farwestern field shows a spread with many values from 30-80 krad, suggestive of <150 ka terrestrial ages. The proportion of meteorites with very low natural TL levels (<5 krad) at each field is comparable to that observed at the Lewis Cliff site and for modern non-antarctic falls, and is also similar to the fraction of small perihelia (<0.85 AU) orbits

calculated from fireball and fall observations. Induced TL data for meteorites from the Allan Hills confirm trends observed for meteorites collected during the 1977/1978 and 1978/1979 field seasons, which show that a select group of H chondrites from the Antarctic experienced a different extraterrestrial thermal history to that of non-antarctic H chondrites. (Auth. mod.)

E-48025

Zastawniak, E., **Late Cretaceous leaf flora of King George Island, West Antarctica**, Symposium on paleofloristic and paleoclimatic changes in the Cretaceous and Tertiary, Prague, Aug. 28-Sep. 1, 1989. Proceedings, Prague, Geological Survey Publisher, 1990, p.81-85, 14 refs.

Fossil plant material was collected on the left shore of Admiralty Bay, near the Arctowski Station, during the 3rd Polish Antarctic Expedition in 1978-1979. The collection consists of 99 imprints of leaf fragments; 3 of the specimens are pteridophyta remains. Five fragments of coniferous shoots found on a rock, and angiosperm remains which could belong to various genera and families, are described and illustrated.

E-48040

Krasnikov, N.N., Fedorov, L.V., **Geological structure of the Fisher massif, eastern Antarctica**, *International geology review*, Dec. 1992 34(12), p.1210-1221, Translated from *Izvestiia Akademii nauk, Seriya geologicheskaya*, 1992, No.8. 8 refs.

The authors present the first detailed description of the geological structure of the Fisher massif in the Prince Charles Mountains in Antarctica. The Fisher complex consists of two predominantly volcanic supracrustal sequences and apparently comagmatic intrusive and dike units. Regional metamorphism reached the cummingtonite amphibolite facies. Preliminary dating suggests an age of about 2310 Ma; the Fisher complex may correspond to an early Precambrian greenstone belt. (Auth. mod.)

E-48044

Bryan, J.R., ed, **Descriptions of sediments recovered by the USCGC *Glacier*, USARP Operation Deep Freeze 1985: South Orkney Plateau, South Shetland Shelf, Bransfield Strait, Marguerite Bay, Pine Island Bay, Florida State University. Sediment Research Laboratory. Contribution**, Aug. 1992 No.54, 179p., Refs. p.175-179.

This volume contains descriptions of sediments obtained during the 1984-1985 austral summer cruise of the U.S. Coast Guard ice-breaker *Glacier*, which surveyed the western margin of the South Orkney Plateau, portions of the Bransfield Strait and the adjacent continental shelf of the South Shetland Is., Marguerite Bay, and Pine Island Bay. This is the 6th published volume of sediment descriptions of material collected by the *Glacier* in antarctic waters since 1968. These are designed to serve the general geologic community by providing descriptive information of shallow sediments surrounding the continent of Antarctica, and also to assist geoscientists wishing to pursue more detailed studies by serving as a guide for sediment sampling. Included are: a summary of the scientific objectives of the 1984-1985 cruise of the *Glacier*; a discussion of core and grab sample recovery and processing; a table and maps of station locations; an explanation of laboratory descriptive procedures; and lithologic descriptions of piston and trigger cores, bagged samples from them, and grab samples.

E-48057

Webers, G.F., ed, Craddock, C., ed, Spletstoeser, J.F., ed, **Geology and paleontology of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, 459p., Refs. passim. For individual papers see E-48058 through E-48079.

This is a collection of 23 papers on the geology and paleontology of the Ellsworth Mountains, based on geologic field studies begun in 1959 and continued in the 1960s and 1979-1980 field seasons. As an aid to investigators preparing manuscripts of this volume, an annotated bibliography of the Ellsworth Mountains was begun; the bibliography of citations, without annotations, is appended. Three maps accompany this book and are enclosed in its back-cover pocket: Geologic map of the Ellsworth Mountains, 1986 (scale 1:250,000); Selected glacial geologic features, Ellsworth Mountains (scale 1:500,000); and Structural map of the Sentinel Range, Ellsworth Mountains (scale 1:250,000).

E-48058

Webers, G.F., Craddock, C., Spletstoeser, J.F., **Geologic history of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.1-8, Refs. p.7-8.

The stratigraphic succession in the Ellsworth Mountains includes strata from Cambrian to Permian in age. No definite evidence of major unconformities in the Ellsworth succession is known, and it is possible that continuous deposition took place from Cambrian to Permian time. The oldest stratigraphic unit, the Heritage Group, was deposited in Middle to Late Cambrian time. More than half of the 13,000+m thick stratigraphic succession of the Ellsworth Mountains was deposited during this time interval. Basic igneous volcanism and tectonic activity occurred in both the source and accumulation areas throughout the deposition of this group. Shallow-marine conditions prevailed during the deposition of the overlying 3,000 m thick Upper Cambrian to Devonian Crashsite Group. Major deformation of the Ellsworth Mountains sedimentary succession, the Ellsworth (Gondwanide) Orogeny, took place in Late Permian or early Mesozoic time. The geomorphic evolution of the Ellsworth Mountains in Cretaceous and Cenozoic time includes the development of an integrated stream valley pattern and later valley and continental glaciation, followed by moderate deglaciation. (Auth. mod.)

E-48059

Webers, G.F., **Heritage Group of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.9-19, 5 refs.

The Heritage Group is composed of about 7,500 m of sedimentary strata exposed in the Heritage Range of the Ellsworth Mountains. The Heritage Group is here redefined to include the Minaret Formation as the uppermost unit. New formations within the Heritage Group are formally described; they are, from the bottom upward, the Union Glacier, Hyde Glacier, Drake Icefall, Conglomerate Ridge, Springer Peak, Liberty Hills, and Frazier Ridge Formations. The Kosco Peak Member of the Union Glacier Formation is also formally described. Deposition of the Heritage Group took place in Middle and early Late Cambrian time in a rapidly subsiding basin bordered by carbonate rock and quartzite source areas of moderate relief. Sediment transport directions were dominantly from the present south and west. Thick volcanoclastic terrestrial strata lie at the exposed base of the group, and these rocks grade upward into deltaic black

shale and normal marine sediments. A number of active volcanic centers were present in the Heritage Range during the deposition of upper Heritage Group strata. (Auth.)

E-48060

Spörli, K.B., **Stratigraphy of the Crashsite Group, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.21-35, 19 refs.

The Crashsite Group of the Ellsworth Mountains, a 3,000 m thick sequence of shallow-water, mostly marine, tan, green, and red quartzose sandstones (quartzites) and argillites, is here subdivided, in ascending order, into the Howard Nunataks Formation (1,630 m), the Mount Liptak Formation (1,070 m), and the Mount Wyatt Earp Formation (300 m). The Mount Wyatt Earp Formation has yielded Devonian fossils. Late Cambrian trilobites occur in the transition beds at the base of the Crashsite Group, and it is probable that the lower parts of the Group include Ordovician and Silurian strata. (Auth.)

E-48061

Matsch, C.L., Ojakangas, R.W., **Stratigraphy and sedimentology of the Whiteout Conglomerate; an upper Paleozoic glacial unit, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.37-62, Refs. p.60-62.

The upper Paleozoic Whiteout Conglomerate, situated conformably upon the Crashsite Group and overlain conformably by the Polarstar Formation, may represent the entire period of Gondwanaland glaciation in West Antarctica. The formation, mainly massive diamictites, makes up about 1,000 m of a 13,000 m thick total stratigraphic column in the Ellsworth Mountains. Petrographically, the diamictites are 62% silt and clay matrix with 38% sand grains and granules. In the northern Sentinel Range, shale-argillite and vein quartz are abundant, but they are absent in the Meyer Hills where carbonate is abundant. Till pellets, products of ablation on glaciers and icebergs, are common in bedded units but rare in the diamictites. The Crashsite Group quartzite and Whiteout Conglomerate are dominated by quartz and quartz-rich lithic fragments, whereas the overlying Polarstar Formation contains abundant volcanogenic detritus, reflecting a dramatic change in source area. Contact zones with both enclosing formations contain scattered oversized clasts. A glacial model suggests that ice sheets generated the glacial sediments of the Whiteout Conglomerate under a polar climatic regime. (Auth. mod.)

E-48062

Collinson, J.W., Vavra, C.L., Zawiskie, J.M., **Sedimentology of the Polarstar Formation (Permian), Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.63-79, Refs. p.77-79.

The Polarstar Formation, a 1 km thick argillite and sandstone unit, is the uppermost part of a thick Cambrian to Permian sedimentary sequence in the Ellsworth Mountains. The formation gradationally overlies the Whiteout Conglomerate, an Upper Carboniferous-Lower Permian glacial diamictite. The lower part of the Polarstar is mostly argillite, and the middle part consists of coarsening-upward cycles of argillite to sandstone. The upper part of the formation consists of fining-upward cycles of channel-form, cross-bedded, medium-grained sandstone overlain by fine-grained sandstone and of *Glossopteris*-bearing siltstone, argillite, and coal. The occurrence of a margin-

al-marine trace fossil fauna in the middle of the formation and the complete absence of a marine shelly fauna suggest depositional conditions ranging from anaerobic to dysaerobic in a stratified inland sea. Detrital grains in Polarstar sandstone indicate a source terrane dominated by silicic to andesitic volcanic rocks, including tuffs, with minor mafic volcanic and low-grade metamorphic and granitic rocks. The Polarstar Formation was probably deposited in a back-arc basin between the Pacific margin of Gondwanaland and the East Antarctic craton. (Auth. mod.)

E-48063

Buggisch, W., Webers, G.F., **Facies of Cambrian carbonate rocks, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.81-100, 17 refs.

Carbonate rocks were studied from the Middle Cambrian Drake Icefall Formation and the Middle to Upper Cambrian Minaret Formation. Additionally, carbonate clasts from the Middle Cambrian Union Glacier Formation and the Permo-Carboniferous Whiteout Conglomerate were examined. No *in situ* Lower Cambrian carbonate rocks are known to crop out in the Ellsworth Mountains; only reworked clasts of such rocks are found in the Heritage Group and the Whiteout Conglomerate. These clasts suggest that during Early (and Middle?) Cambrian time, a wide carbonate platform developed in or close to the Ellsworth Mountains. Oolites are common, and a high-energy environment was required to form these oosparites. The lowest *in situ* marly and oolitic carbonates are found in the Middle Cambrian strata of the Heritage Group north of Drake Icefall. The Upper Cambrian Minaret Formation is also autochthonous, and its thickness increases southward from 8 m in the northern Webers Peaks to several hundred meters in the Marble Hills area. Medium to high hydrodynamic energy conditions prevailed during the decomposition of the Springer Peak section of the Minaret Formation (biosparite, oncosparite, pelsparite). The high diversity of the fauna indicates an open marine environment. (Auth. mod.)

E-48064

Jago, J.B., Webers, G.F., **Middle Cambrian trilobites from the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.101-124, Refs. p.123-124.

Trilobites, probably Middle Cambrian, were collected at 6 localities in the Heritage Range of the Ellsworth Mountains, including Yochelson Ridge, Drake Icefall area, Edson Hills, Liberty Hills (2 locations), and Marble Hills. The total fauna includes 14 genera (2 new) and 32 species (5 new). Due to original preservation and/or deformation, a number of the forms are not assignable to specific taxa. The new taxa described herein are *Peronopsis deons* sp. nov., *Pagetia edsonensis* sp. nov., *Sohopleura drakensis* gen. et sp. nov., *Pseudobergeronites spinosa* gen. et sp. nov., and *Blountia perplexa* sp. nov. The trilobites were found in formations of the upper Heritage Group (Springer Peak Formation, Drake Icefall Formation, and Liberty Hills Formation). The trilobite faunas described show affinities with faunas from northern Victoria Land (Antarctica), Tasmania, Queensland, China, Kazakhstan, and North America. All faunas are probably Middle Cambrian in age (Templetonian and Boomerangian on the Australian biochronological scale). (Auth.)

E-48065

Shergold, J.H., Webers, G.F., **Late Dresbachian (Idamean) and other trilobite faunas from the Heritage Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.125-168, Refs. p.166-167.

Late Cambrian (Late Dresbachian; Idamean) trilobite faunas have been recovered from 4 localities (Inferno Ridge, Yochelson Ridge, Springer Peak, and the Windy Peak-Pipe Peak area) in the Heritage Range. Trilobites are most abundant, best preserved, and most diverse in the Minaret Formation at Springer Peak, where they are associated with monoplacophorans, gastropods, rostroconchs, archaeocyathids, articulate and inarticulate brachiopods, pelmatozoans, conodonts and algae. The Heritage Range material includes taxa with North American, Australian, Chinese and southern Russian affinities, and represents three distinct faunal assemblages. From the 4 localities 15 genera, 1 new subgenus, and 24 species (8 new) are described. New taxa include *Isolagnostus* (*Obelagnostus*) *imitor* n. subgen., n. sp., *Eugonocare?* *nebulosum* n.sp., *Changshanocephalus?* *suspisor* n.sp., *Bathyholcus?* *conifrons* n.sp., *Protamnites magnificans* n.sp., *Onchopeltis variabilis* n.sp., ?*O. acis* n.sp., and ?*O. neutra* n.sp. (Auth. mod.)

E-48066

Buggisch, W., Webers, G.F., Repetski, J.E., Glenister, L., **Cambrian conodonts from the Springer Peak and Minaret Formations, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.169-179, Refs. p.178-179.

Cambrian rocks of the Springer Peak and Minaret formations of the upper Heritage Group contain conodont faunas. The upper Middle Cambrian Springer Peak Formation has yielded a conodont cluster referable to *Phakelodus*, and the Upper Cambrian Minaret Formation has yielded conodonts of the genera *Furnishina*, *Proacodus*, *Phakelodus*, and *Westergaardodina*. Three species each of *Furnishina* and *Westergaardodina* are known worldwide; other specimens of *Westergaardodina* may represent new species, but low numbers and generally poor preservation prevent reliable diagnosis. All of the identified paraconodont and protoconodont taxa are long ranging, but they are consistent with the Cambrian age of the host rocks as determined by the other contained fossils. (Auth.)

E-48067

Webers, G.F., Pojeta, J., Jr., Yochelson, E.L., **Cambrian mollusca from the Minaret Formation, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.181-248, Refs. p.246-248.

Cambrian mollusks are known from 4 localities in the limestone of the Minaret Formation, Heritage Range. The most diverse and best-preserved specimens are from the coquina at the feather edge of the Minaret Formation, on the northeastern side of Springer Peak, Webers Peaks. This locality has provided one of the finest Upper Cambrian mollusk faunas in the world. The mollusks indicate a Dresbachian to Franconian age. The trilobites associated with the mollusks define the age of the rocks at Springer Peak as late Dresbachian (Idamean). These rocks were first thought to be Precambrian in age. From the 4 localities, 19 genera (4 new) and 20 species (12 new) are described; there are 7 species of monoplacophorans placed in 7 genera, 6 species of gastropods placed in 6 genera, 3 species of

hyoliths placed in 3 genera, and 3 species of rostroconchs placed in 3 genera. Various of the genera of mollusks known from the Minaret Formation, as well as one species, are geographically widespread in rocks of Late Cambrian age in Australia, northeastern China, and the upper Mississippi River Valley and Ozark Dome regions of the United States. Geographic distributions are discussed under each taxon. (Auth. mod.)

E-48068

Henderson, R.A., Debrenne, F., Rowell, A.J., Webers, G.F., **Brachiopods, archaeocyathids, and Pelmatozoa from the Minaret Formation of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.249-267, 38 refs.

A diverse Late Cambrian fossil fauna was recovered from the Minaret Formation; the articulate and inarticulate brachiopods, archaeocyathids, and Pelmatozoa are described. Inarticulate brachiopods make up a small percentage of the Springer Peak fauna but are abundant enough to be present in most hand specimens. Preservation is poor. Genera present include *Dactylotreta*, *Lingulella*, *Micromitra*, *Quadrisonia*, *Schizambon*, *Treptotreta*, *Zhanatella*, and *Angulotreta*, which is represented by a new species *A. ellsworthensis*. The assemblage has affinities with those of Australia, suggesting an early Late Cambrian (upper Idamean) age. Articulate brachiopods are rare in the Springer Peak fauna, and a single species resembling *Billingsella borukaevi* is present. Archaeocyathids make up a small percentage of the fauna but are abundant on some bedding surfaces. They are represented by a single species referred to *Antarcticocyathus webersi*. Pelmatozoa are rare, but abundant columnals, probably representing eocrinoids, are present on some bedding surfaces. (Auth. mod.)

E-48069

Webers, G.F., Glenister, B., Pojeta, J., Jr., Young, G.C., **Devonian fossils from the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.269-278, 53 refs.

In the northern Heritage Range of the Ellsworth Mountains, collection from strata known as Mt. Wyatt Earp Formation of the Crash-site Group has yielded a diverse but sparse and poorly preserved fauna, dominated by orbiculoid brachiopods (*Orbiculoidea* cf. *falklandensis* Rowell). Also present in the fauna are cephalopods (identifiable only to the order Orthocerida), pelecypods (*Nuculites* aff. *N. cuneiformis* Conrad; and *Grammysiodes?* sp. indt.), a rostroconch (*Hippocardia?* sp. indt.), gastropods (*Holopea?* sp. indt.), a fish spine (*Machaeracanthus* cf. *kayseri* Kegel), and single unidentifiable specimens of a conularid, a trilobite, and an articulate brachiopod. The fauna correlates with those of the Lower Devonian Horlick Formation, Ohio Range, Horlick Mountains, Antarctica, and with those of the Lower Devonian of the Falkland Is. and represents the Malvinokaffric Faunal Province. (Auth.)

E-48070

Debrenne, F., **Archaeocyathan fauna from the Whiteout Conglomerate, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.279-284, 20 refs.

A small collection of limestone clasts from the Whiteout Conglomerate (Permo-Carboniferous), Ellsworth Mountains, was examined for archaeocyathids and other fossils. Thirty or more poorly preserved archaeocyathid specimens are here referred to as *Ajacicya-*

thus sp., *Gordonicyathus* sp., *Erismacoscinus* cf. *endutus*, ?*Graphocyphia* sp., and *Paranacyathus* cf. *parvus*, ?*Dictyocyathus quadruplex*, and *Archaeocyathus* sp. Other fossils observed but not described include fragmentary specimens of sponge spicules, *Chancelloria* rosettes, trilobites, and brachiopods. The limestone clasts were derived from a source area with exposed Lower Cambrian strata. (Auth.)

E-48071

Vennum, W.R., **Igneous petrology and geochemistry of the southern Heritage Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.295-324, Refs. p.323-324.

Igneous rocks exposed in the southern Heritage Range include 2 diabasic sills, 3 gabbroic stocks, a spessartite lamprophyre plug, a 10 sq km sanidine quartz phyric dacite stock, and numerous aphanitic to porphyritic dikes and lava flows. Lava flows that are largely basaltic, but range in composition from basalt to alkali rhyolite, compose about 10-15% of the 1,000 m thickness of the Liberty Hills Formation of the Heritage Group. Eighty-four samples have been analyzed for major, minor, and trace elements by x-ray fluorescence. Field relations and comparison of chemical composition of intrusive and extrusive rocks suggest that all igneous rocks in the southern Heritage Range except the dacite stock were emplaced in Cambrian time; all have undergone pumpellyite-actinolite or greenschist facies metamorphism. Age relations and comparison of chemical compositions indicate that the southern Heritage Range igneous rocks are not correlative with either the Jurassic Ferrar Supergroup or the Jurassic Kirwan Volcanics of the Transantarctic Mountains. It is concluded that the bimodal basaltic-rhyolitic suite of igneous rocks from the southern Heritage Range was emplaced in a continental area undergoing extensional tectonism and does not represent an island arc-continental margin subduction zone complex. (Auth. mod.)

E-48072

Dreschhoff, G.A.M., Zeller, E.J., Thoste, V., **Radioelement distribution in the sedimentary sequence of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.325-331, 14 refs.

Airborne gamma-ray spectrometry can be used as a remote sensing technique to measure the radioelement distribution in the sedimentary sequence that crops out in the Ellsworth Mountains. By means of a highly sensitive detector system it is possible to obtain an almost instantaneous chemical analysis for equivalent uranium, thorium, and potassium that is updated in flight each second. Data provided by this technique, together with visual information recorded during flights, can serve as a reliable basis for stratigraphic correlation and can furnish additional information on diagenetic and sedimentological factors. The radiometric signature of each of the outcropping sedimentary units was determined, and this signature was found to vary within clearly defined limits. The study revealed no significant radiometric anomalies in the Ellsworth Mountains, and this implies that the low-grade metamorphism which is widespread in the area was not sufficient to cause substantial alteration of the original radioclement distribution in the sedimentary rocks. (Auth.)

E-48073

Bauer, R.L., **Pre-tectonic burial metamorphism in the Heritage Group, southern Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.333-349, Refs. p.348-349.

The Middle to Upper Cambrian Heritage Group, exposed in the Heritage Range of the Ellsworth Mountains, contains interlayered basaltic lava flows and intrusive gabbroic stocks, dikes, and sills that preserve evidence of a pre-tectonic burial metamorphism. Three zones ranging from the upper prehnite-pumpellyite facies (zone I) through the pumpellyite-actinolite facies (zone II) to the greenschist facies (zone III) are correlated with stratigraphic depth of the mafic igneous rocks in the Heritage Group. A temperature of approximately 370 C is obtained for the boundary between the pumpellyite-actinolite facies and the greenschist facies on the basis of Fe/(Fe + Al) in epidote coexisting with pumpellyite + chlorite + actinolite + quartz. A geothermal gradient of approximately 23 to 24 deg. C/km is estimated for the stratigraphic interval containing pumpellyite-actinolite facies assemblages. Syntectonic recrystallization associated with the development of penetrative foliation in the metasedimentary country rocks is only sparsely developed in the prehnite- and/or pumpellyite-bearing mafic igneous rocks, whereas the more penetratively deformed igneous rocks lack evidence of subgreenschist facies conditions. This differential recrystallization may account for the variation in K-Ar whole-rock ages reported previously for the mafic igneous and metasedimentary rocks of the Heritage Group. (Auth.)

E-48074

Spörli, K.B., Craddock, C., **Stratigraphy and structure of the Marble, Independence, and Patriot hills, Heritage Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.351-364, 11 refs.

The Marble, Independence, and Patriot hills at the southern end of the Ellsworth Mountains consist dominantly of Cambrian limestones that occur in two major facies: gray, well-bedded limestones, and white, massive, marblelike limestone. The latter rock type may in part be of tectonic origin. Conglomerates in the Patriot Hills underlie the limestones, which in turn are correlated with limestones at the top of the Heritage Group at Webers Peaks to the north in the Heritage Range. Folds mainly verge northeastward and trend northwestward, and the major structures are anticlines along the western and eastern margins of the area with an intervening synclinalorium. The westernmost anticline is cut by a thrust fault that also displaces some postfolding breccia bodies. Late-phase conjugate strike-slip faults, en echelon extension gashes, and calcite fiber striations indicate a changed orientation of the principal horizontal stress, probably from a northeast-southwest to a northwest-southeast orientation. The main phase of deformation is assigned to the Ellsworth or Gondwanide Orogeny, probably early Mesozoic in age. (Auth.)

E-48075

Spörli, K.B., Craddock, C., Rutford, R.H., Craddock, J.P., **Breccia bodies in deformed Cambrian limestones, Heritage Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Splettstoesser, p.365-374, 12 refs.

Breccia bodies in the carbonate rocks of the Minaret Formation (Cambrian) of the Ellsworth Mountains were formed at depth by a

combination of cavelike processes and contemporaneous low-temperature hydrothermal activity during the latest stages (early Mesozoic?) of compressive deformation in this fold belt. The breccia bodies consist of clasts of Minaret Formation limestone/marble with cleavage, embedded in a matrix of crystalline and detrital calcite; both clast shape alignments and the matrix locally show layering. Clast angularity and edge dissolution vary greatly as does the distance of clast transport (mainly downward). The boundaries between a breccia body and the adjacent country rock may be diffuse or sharp. Breccia body shapes, sizes and orientations are varied; bodies are as high as approximately 250 m and as wide as 50 m. Many breccia bodies crosscut each other, showing that breccia body formation continued through a period of time. Fluid inclusions in calcite crystals from a vuggy vein yield a crystallization temperature of 160 ± 5 °C. That temperature and the inferred thickness of the overlying stratigraphic succession suggest that the breccia bodies may have formed at a depth as great as 5,000 m. (Auth.)

E-48076

Spörli, K.B., Craddock, C., **Structure of the Heritage Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.375-392, 11 refs.

The main structure of the Heritage Range is an anticlinorium that trends slightly oblique to the range and is flanked on the east by a major synclinorium. This structural pattern is due to probably simultaneous interference folding, with fold axes trending both northwest-southeast and north-south. Second-phase folding occurs only locally, and it is coaxial with the main folds; the folding and cleavage development were followed by the formation of thrust, strike-slip, and normal faults. During the initial faulting the axis of greatest principal stress was perpendicular to the range, but this axis subsequently rotated (counterclockwise) until it was oriented parallel to the tectonic grain. Breccia bodies in Cambrian limestones at the southern end of the range postdate most of the deformation, but they have been affected by late fault movements. All these structures are thought to have formed during the Ellsworth (Gondwanide) Orogeny, probably in early Mesozoic time. (Auth.)

E-48077

Craddock, C., Spörli, K.B., Anderson, J.J., **Structure of the Sentinel Range, Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.393-402, 9 refs.

The 5,500+ m Paleozoic succession of the Sentinel Range includes the Heritage Group (Cambrian), the Crashsite Group (Cambrian and younger, including Devonian), the Whiteout Conglomerate (Carboniferous?), and the Polarstar Formation (Permian). The Sentinel Range succession was subjected to mild burial metamorphism, and later dynamothermal metamorphism reached lower greenschist facies. The folds in the range plunge gently northward, and the entire Sentinel Range block may be slightly tilted eastward. Stratigraphic similarities with rocks of the Transantarctic Mountains make it likely that the Ellsworth Mountains have moved and rotated away from the margin of East Antarctica, but the sense of such a rotation cannot be determined at present. In addition, similarities exist between the Sentinel Range younger rocks and those in the Cape Fold Belt of southern Africa, as predicted by Du Toit (1937), but the Cambrian System of the Sentinel Range lacks a definite counterpart in Africa. (Auth. mod.)

E-48078

Denton, G.H., Bockheim, J.G., Rutford, R.H., Andersen, B.G., **Glacial history of the Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.403-432, Refs. p.431-432.

The West Antarctic Ice Sheet flows seaward around and through the Ellsworth Mountains to feed the Filchner-Ronne Ice Shelf. A high ice-sheet surface, featuring a major inland divide, abuts the western mountain flank. The present-day grounding line of the Filchner-Ronne Ice Shelf is near the eastern mountain flank. Two major erosion glacial features characterize the Ellsworth Mountains. First, the exposed mountains show classic features of alpine glacier erosion. These are best developed in the Sentinel Range of the northern Ellsworth Mountains where cirque erosion has left horns, arêtes, and sharp spurs. Second, a glacial trimline is etched into alpine ridges and spurs throughout the Ellsworth Mountains. Elevations of this trimline show a remarkably consistent pattern. Bedrock ridges above the trimline are serrated, whereas those below the trimline lack serrations, and some show glacial polish and striations. Drift patches and erratics occur below the trimline. It is inferred that substantial grounding of West Antarctic ice occurred in the Weddell Sea embayment when the West Antarctic Ice Sheet stood at the trimline. Two widely opposing age models for ice-sheet expansion to the trimline are proposed. In one model the expansion is late Wisconsin/Holocene in age. In the other model the expansion is pre-late Quaternary, and perhaps Tertiary, in age. (Auth. mod.)

E-48079

Vennum, W.R., Nishi, J.M., **Chemical weathering of Cu, Fe, and Pb sulfides, southern Ellsworth Mountains, West Antarctica**, *Geological Society of America. Memoir*, 1992 No.170, Geology and paleontology of the Ellsworth Mountains, West Antarctica, edited by G.F.Webers, C. Craddock and J.F. Spletstoeser, p.433-441, 37 refs.

Forty-eight samples of green, blue, yellow, orange, and red surficial salts and efflorescences were collected at widely scattered localities in the southern half of the Heritage Range of the Ellsworth Mountains. All salts form by the oxidation of pyrite, chalcopyrite, or galena and then are preserved by the cold, arid antarctic climate. The assemblage of copper salts is different from that recently described from the Orville Coast (atacamite, antlerite, brochantite, plancheite) 500 km to the northeast. The difference in copper salts found at these two localities, coupled with studies of marine-derived antarctic aerosols, suggests that malachite, azurite, and chalcantite will be the common secondary copper minerals found deeper in the antarctic interior, and that copper chloride compounds will become less abundant farther away from the coast. This is the second reported occurrence of fibroferrite and the first reported occurrences of alunogen, anglesite, beaverite, chalcantite, and paratacamite from Antarctica. (Auth. mod.)

E-48091

Huber, B.T., **Upper Cretaceous planktic foraminiferal biozonation for the Austral Realm**, *Marine micropaleontology*, Dec. 1992 20(2), p.107-128, 50 refs.

A new planktic foraminiferal zonal scheme is presented for subdivision of Upper Cretaceous pelagic carbonate sequences in the circum-antarctic region. Definition of the zones and subzones is based on study of foraminifera from 13 deep-sea sections that were poleward of 50S paleolatitude and within the Austral Biogeographic Realm during Late Cretaceous time. The proposed biostratigraphic scheme includes seven Upper Cretaceous zones, with an average stratigraphic resolution of 4.4 m.y., and six subzones, which are all within the

Maastrichtian Stage, with an average stratigraphic resolution of 1.4 m.y. Diminished resolution in the pre-Maastrichtian sediments of southern high latitude sections results from (1) incomplete recovery of the middle Campanian, lower Santonian and most of the Cenomanian-lower Coniacian intervals; (2) presence of local and regional hiatuses; (3) paleobathymetric shallowing with increasing age at some sites, resulting in impoverished older planktic assemblages; and (4) poorer preservation with increasing burial depth. Cross-latitude correlation of the Campanian and older austral sequences may be improved with future drilling by recovery of sections that span existing stratigraphic gaps. Correlation of high latitude bioevents with chemostratigraphic events and their intercalibration with the magnetostratigraphy and the Geomagnetic Polarity Time Scale are needed for better chronostratigraphic resolution in existing high latitude sequences.

E-48099

Hotten, R., **Mafic dykes of the Shackleton Range, Antarctica: petrography, geochemistry, isotope geochemistry, and palaeomagnetism** [Die mafischen Gänge der Schackleton Range/Antarctica: Petrographie, Geochemie, Isotopengeochemie und Paläomagnetik], *Berichte zur Polarforschung*, 1993 No.118, 225p., In German with English summary. Refs. p.210-213.

Petrographic investigations show that five "basalt groups" can be distinguished. The dykes in the northern part of the Shackleton Range are divided into basalt groups I, II, and III, the dykes of the Read Mountains, situated in the southern part of the Shackleton Range, into basalt groups IV and V. All dyke rocks have a fine to medium-grained subophitic texture. Magmatic components are plagioclase, augite, and opaque minerals; orthopyroxene, biotite, olivine, hornblende, alkali feldspar, and apatite can also be found. In addition to differences in the magmatic composition, the definition of the basalt groups is based on the degree of alteration and, in some cases, on metamorphism. The dykes of the basalt groups I to III are only hydrothermally altered at different intensities, whereas the composition of secondary minerals in the rocks of the basalt groups IV and V reveal a very low-grade to low-grade metamorphism. Magnetic and geochemical studies provide additional information on the development of the crust in the region as well as approximations of the ages of the various structures. (Auth. mod.)

E-48111

Tranter, T.H., **Underplating of an accretionary prism: an example from the LeMay group of central Alexander Island, Antarctic Peninsula**, *Journal of South American earth sciences*, July/Aug. 1992 6(1/2), p.1-20, With Spanish summary. 59 refs.

The LeMay Group of Alexander I. is a Mesozoic accretionary prism that was constructed during subduction of Pacific and proto-Pacific oceanic crust. In central Alexander I. two underplated units are identified: (i) a sandstone-mudstone association, consisting of thin- to medium-bedded non-channelled turbidite deposits, representing probable trench fill, and (ii) a basalt-chert association, representing oceanic-crustal rocks, and its siliceous sedimentary cover. These two units are complexly deformed by dominantly westward- (oceanward-) directed thrusting. Structural relief introduced by later faulting reveals a wide range of structural styles and metamorphic grades representing different levels within the progressively deforming underplated units. Deformation ranges from thrust-related stratal disruption of poorly-lithified clastic sediment to the development of pervasive cleavage fabrics. Microstructural evidence reveals the importance of fluids in controlling deformation. Such microstructural criteria may be crucial to the identification of underplated units in other ancient accretionary prisms where the overall large-scale structural geometry cannot be reconstructed from fragmentary exposures. (Auth. mod.)

E-48112

Stern, C.R., Mukasa, S.B., Fuenzalida P., R., **Age and petrogenesis of the Sarmiento ophiolite complex of southern Chile**, *Journal of South American earth sciences*, July/Aug. 1992 6(1/2), p.97-104, With Spanish summary. 17 refs.

Zircon fractions separated from fine-grained plagiogranites, interpreted to be cogenetic with the mafic rocks of the Sarmiento ophiolite complex in southern Chile, yield slightly to grossly discordant age patterns for which the lower concordia intercept U-Pb ages of 140.7 (Lolos Fjord) and 137.1 (Encuentro Fjord) are well constrained. These dates are interpreted as formation ages for the northern portion of the igneous floor of the Rocas Verdes basin, and they are younger than the age of 150 Ma determined for a more southern portion of the floor of this basin on South Georgia I. Coarse-grained trondhjemites within the gabbro units of the Sarmiento complex yield a lower concordia intercept U-Pb age of 147 and a poorly defined upper intercept reflecting an inherited zircon component, possibly of Proterozoic age. These rocks are interpreted as remobilized fragments of country rocks entrapped within the essentially mantle-derived rocks of the ophiolite complex. (Auth.)

E-48113

Bruce, R.M., Nelson, E.P., Weaver, S.G., Lux, D.R., **Temporal and spatial variations in the southern Patagonian batholith; constraints on magmatic arc development**, *Geological Society of America. Special paper*, 1991 No.265, Andean magmatism and its tectonic setting, edited by R.S. Harmon and C.W. Rapela., p.1-12, 35 refs.

The plutonic record of the southern Patagonian batholith extends from 165 to 11 Ma, with a peak between 120 to 70 Ma that coincides with the Cretaceous global maximum in sea-floor spreading and the climax of the Andean orogeny. A spectrum of lithologies from gabbro to granite was intruded throughout the history of the batholith. Most plutons crystallized at middle crustal depths. At a local scale of 5,000 to 10,000 sq km, plutonism appears episodic and diachronous with adjacent areas, exhibits a gradual change from gabbro to granite over tens of millions of years, and is accompanied by a decrease in initial Sr. Therefore the lithologic progression must result from enduring processes that span the life of many individual magma batches, and cannot result from a progressive increase in crustal contamination. The gradual change in lithology, the generally undeformed nature of the batholith, and the stable position of axial intrusion suggest that the arc developed in a relatively stable tectonic setting. This contrasts strongly with the complex tectonic history of the foreland region. The batholith is exposed at mesozonal levels, whereas the foreland region is exposed at epizonal levels. Thus, not only does the tectonic record vary laterally across Andean orogens, but can vary depending on the crustal level examined. (Auth. mod.)

E-48114

Hanson, R.E., Wilson, T.J., **Submarine rhyolitic volcanism in a Jurassic proto-marginal basin; southern Andes, Chile and Argentina**, *Geological Society of America. Special paper*, 1991 No.265, Andean magmatism and its tectonic setting, edited by R.S. Harmon and C.W. Rapela, p.13-27, Refs. p.25-27.

Widespread Jurassic extension and rhyolitic volcanism in southern South America were manifested in the southern Andes by the development of a deep-marine volcano-tectonic rift basin extending for some 1,000 km parallel to the continental margin. This basin was contemporaneous with other narrow rift basins that formed within Gondwana during the initial stages of supercontinent fragmentation. A Cretaceous marginal basin in the southern Andes opened as continued extension led to spreading within the preexisting rhyolitic rift,

or proto-marginal basin. Rapid subsidence and inundation of eroded basement immediately preceded deposition of several kilometers of rhyolitic lavas and pyroclastic rocks in deep-marine environments in the Late Jurassic proto-marginal basin. The volcanic rocks record the effects of subaqueous quenching, interaction of uprising magma with thick sections of wet sediment, and large-scale phreatomagmatic eruptions. In contrast, coeval extension-related rhyolites elsewhere in southern South America form a typical subaerial ignimbrite field. These contrasting styles of Jurassic volcanism resulted from differential subsidence along the continental margin, which appears to reflect the response of relatively young Gondwanide accretionary basement to extension associated with supercontinent breakup. (Auth.)

E-48115

Wang, D.D., Lin, Y.T., **Inspiration from study of antarctic meteorites. 1: petrologic and compositional evidences for early continuous chemical fractionation of the solar nebula**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.1-15, In Chinese with English abstract. Refs. p.13-15.

Bulk concentrations of Ir, Os, Co and the other siderophile elements of the metal phase in chondrites increase significantly with degree of oxidation which, together with Co-content of kamacite and Fa-content of olivine, reveal a continuous trend of variation of redox among chondrites. Intermediate groups of E/H, H/L, L/L, and LL/C, lying between E and H, H and L, L and LL, LL and C, respectively, are proposed based on Co-content of kamacite, Fa-content of olivine, Fs-content of low Ca pyroxene, bulk concentrations of Ir, Os and Co of the metal phase and other criteria of classification. The discovery of intermediate groups increases the number of groups of chondrites from 9 to 13. Both the variation of redox among chondrites and the existence of intermediate groups of chondrites suggest a continuous chemical fractionation in the primordial solar nebula. (Auth.)

E-48116

Wang, Y.X., Shen, Y.B., Yang, J.D., **Evidences of Sm-Nd and Rb-Sr isotopes and trace element for Late Cretaceous volcanic rocks from depleted mantle source on King George Island, Antarctica**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.16-30, In Chinese with English summary. Refs. p.28-29.

Twelve tuffite samples, collected from the Upper Cretaceous Half Point Formation of southeastern Fildes Peninsula during the 1987-1988 season, were decomposed in Teflon bombs. Rb, Sr and REE were separated from the major elements with a cation column. Results of isotopic analysis of Rb, Sr, Sm and Nd are presented in tables. A good linearity (R) of Rb-Sr isotopic isochron, and the identity of (Sr-87/Sr-86)_i values reflect the homogenization of Sr isotope of the source region. The value of 71.33 ± 0.3 Ma by Rb-Sr rock isochron is adopted as the crystallization age of the rocks, or as the age of the volcanic eruption. The samples have higher Nd-143/Nd-144 (0.512922-0.512954), lower Sr-87/Sr-86 (0.70318-0.703320) and slightly negative Nd-143/Nd-144 and Sr-87/Sr-86 relations than those in the typical range of oceanic island basalts. Based on different geochemical features and structural environment, it is concluded that the volcanic rocks of the Half Three Point Formation were formed from mantle-derived magmas during the island's volcanic activities.

E-48117

Yu, S.H., **Elemental geochemical characteristics of Late Quaternary Yanwo Lake core from the Great Wall Station, King George Island, Antarctica**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.31-37, In Chinese with English summary. 8 refs.

Reported in this paper are the contents, distribution, statistical values, relative rich coefficients and interrelated matrix of elements in

Late Quaternary sediments of a core from the Yanwo Lake at the Great Wall Station. Results show that the lam (clayey soil) is very rich in Cs, As and Ba, and poor in Cr and Hf; the sand is rich in Ni, Zn, Au and Sr, and poor in Ta, Zn and E; and the gravel is rich in Rb, and poor in Fe, Cs, Th, As and Ba. The relative rich coefficients of the elements in the Yanwo Lake core crust, sedimentary rock and loess show that the K, Rb, Cs, Ya, Hf, U, Th, Zn, Sr and Ba have great movable ability; Na, Fe, Co, Zr, Sc and As have medial movable ability; and Ni, Mo and Au have weak movable ability. (Auth. mod.)

E-48122

Elliot, D.H., ed, **Contributions to antarctic research III, American Geophysical Union. Antarctic research series**, 1992 Vol.57, 155p., Refs. passim. For individual papers see 47-2868 through 47-2874 or B-48123, E-48125 through E-48128, F-48124 and F-48129.

This is the 3rd issue of "Contributions to Antarctic Research" of the Antarctic Research Series, which is designed to make results of antarctic fieldwork available. It consists of 7 papers dealing with irradiance measurements in perennially ice covered lakes, oxygen isotope study of ice fields in East Antarctica, antarctic nearshore marine hydrochemical variability, reconstruction of Late Pleistocene grounded ice sheet on the Ross Sea continental shelf, Late Quaternary glacial history of the Antarctic Peninsula, Pliocene-Pleistocene seismic stratigraphy of the Ross Sea, and gravity measurements on the Ross Ice Shelf.

E-48125

Berkman, P.A., Foreman, D.W., Mitchell, J.C., Liptak, R.J., **Scallop shell mineralogy and crystalline characteristics: proxy records for interpreting antarctic nearshore marine hydrochemical variability**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.27-38, 66 refs.

Trace element concentrations in modern antarctic scallop shells, collected across a nearshore depth gradient adjacent to a summer glacial meltwater stream in west McMurdo Sound, significantly decreased with depth. These antarctic scallop shells, as with bay scallop and sea scallop shells, reveal that isomorphous substituents with atomic radii larger than that of calcium are substituted into the intracrystalline lattice sites of the unit cells. Divalent cations with smaller atomic radii, even if they reflect nearshore environmental variation today, may occur outside of the unit cells in intercrystalline spaces that would be susceptible to diagenesis over time. Significant differences between the crystalline characteristics and the mineralogy of the upper and lower scallop valves also indicate that the shell valves cannot be indiscriminately used to assess environmental variation. Future mineralogical analyses of antarctic scallop shells, and other coastal marine species that have fossils around the continent, should focus on the relatively stable compositional characteristics of the unit cells to interpret Holocene environmental variability associated with the ice sheet margins. (Auth. mod.)

E-48126

Anderson, J.B., Shipp, S.S., Bartek, L.R., Reid, D.E., **Evidence for a grounded ice sheet on the Ross Sea continental shelf during the Late Pleistocene and preliminary paleodrainage reconstruction**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.39-62, 62 refs.

The Ross Sea exhibits north-south oriented troughs associated with modern ice streams and outlet glaciers. Seismic reflection profiles across the troughs show evidence that they were glacially eroded. Seismic records show morphologic features interpreted as till tongues,

morainal banks and possibly glacial deltas formed near the grounding line of the former marine ice sheet. Piston cores from the continental shelf penetrated diamictos whose origin and age are problematic. Detailed petrographic analyses of the minerals and rocks comprising these diamictos were conducted to determine subglacial versus glacial marine origin and to reconstruct the glacial setting of the Ross Sea during the most recent glacial maximum. The most detailed work was conducted in the western Ross Sea. The results show that diamictos do occur in distinct petrologic provinces. This is consistent with deposition from the basal debris zone of either an ice sheet or an ice shelf. The data demonstrate that the East Antarctica ice sheet and West Antarctica ice sheet grounded on the continental shelf during the last glacial maximum. In the western Ross Sea the grounding line existed near the shelf break. Diamictos from the central and eastern portion of the continental shelf contain stable mineral and rock fragments, indicating considerable recycling of these particles. (Auth. mod.)

E-48127

Pope, P.G., Anderson, J.B., **Late Quaternary glacial history of the northern Antarctic Peninsula's western continental shelf: evidence from the marine record**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.63-91, 37 refs.

Piston and gravity cores and bottom profiler records from the northern Antarctic Peninsula's western continental shelf were examined to reconstruct the glacial setting of this region during the last glacial maximum. The precision depth records (PDR) reveal evidence of subglacial scouring within Marguerite Bay and the inner portions of the continental shelf, with the exception of Biscoe Trough, whose bed is scoured partially onto the outer shelf. Piston cores reflect a modern depositional setting typical of the antarctic continental shelf; terrigenous sediments are deposited as ice-rafted debris (IRD) in a marine environment where currents sweep fine sediments from the shallow banks of the shelf, leaving sandy lags, and deposit these fines in shelf depressions. Piston cores recovered basal till only from the inner shelf and from the floor of Biscoe Trough. Transitional glacial marine sediments are most prevalent in the southern portion of the study area near Marguerite Bay. Reconstruction for the last glacial maximum places a marine ice sheet in Marguerite Bay and on the inner shelf. Glacial ice retreated rapidly from the northern regions. Concurrently, offshore of Marguerite Bay an ice tongue (or small ice shelf) and associated pack ice canopy slowly retreated, yielding to open marine sedimentation during the early Holocene. Carbon 14 data indicate that the ice shelf retreated from Marguerite Bay sometime after 12,430 years B.P. (Auth. mod.)

E-48128

Alonso, B., Anderson, J.B., Díaz, J.I., Bartek, L.R., **Pliocene-Pleistocene seismic stratigraphy of the Ross Sea: evidence for multiple ice sheet grounding episodes**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.93-103, 33 refs.

The distribution, morphology and thickness of Pliocene-Pleistocene deposits on the Ross Sea continental shelf were mapped using high-resolution seismic reflection data acquired during the U.S. Antarctic Program 1990 cruise. Chronostratigraphic control is provided by Deep Sea Drilling Project (DSDP) leg 28 drill sites on the shelf. In the western Ross Sea, the Pliocene-Pleistocene section is relatively thin and is restricted mainly to the outer shelf. However, the Eastern Basin contains a relatively thick (up to 600 ms) and widespread Pliocene-Pleistocene section that has been subdivided into 7 seismic units. On the basis of the original biostratigraphic work on cores from DSDP site 271, the 3 lower units are Pliocene in age, and the youngest unit is Pleistocene in age. The age of the three middle units was not deter-

mined; the aggradational stacking pattern of these units indicates a Pleistocene age. The 7 units reflect multiple ice sheet grounding events during which the ice sheet extended to the shelf break, followed by retreat from the shelf. These fluctuations in grounding line position indicate extreme variations in the antarctic climate and sea level. Ice sheet grounding events do not require a polar climate; they could reflect subpolar to temperate shifts in climate. (Auth. mod.)

E-48134

Pittenger, H.A., **Geotechnical properties of siliceous sediments from the Voring Plateau, Norwegian Sea and the Kerguelen Plateau, southern ocean**, College Station, TX, Texas A and M University, 1992, 163p., University Microfilms order No. 93-00495, Ph.D. thesis. Refs. p.117-122.

Cores retrieved from Ocean Drilling Program Legs 104 and 119 reveal that siliceous sediments have relatively high porosities and permeabilities. As expected, undrained shear strengths in siliceous sections are relatively low and largely dependent on the abundance and mineralogy of accessory clays. These characteristics imply that siliceous sediments should be especially prone to slope failures. Determination of plastic limits provides a simple and fairly accurate means of determining biogenic silica content in these sediments. Although siliceous sediments are very compressible in laboratory consolidation tests, they appear to undergo very little *in-situ* consolidation. As a result, siliceous sediments probably play an important role in the structural development of pelagic-dominated convergent plate margins, characterized by underconsolidated sediments, by maintaining high sediment pore pressures. On the Voring and Kerguelen Plateaus, consolidation state is a function of sedimentation rate and is a useful stratigraphic tool for identifying the presence and nature of unconformities. In conformable sections, siliceous sediments are increasingly underconsolidated with depth. (Auth. mod.)

E-48135

Pelayo, A.M., **Earthquake source parameter inversion using body and surface waves: applications to tsunami earthquakes and to Scotia Sea seismotectonics**, St. Louis, MO, Washington University, 1990, 252p. (Pertinent p. 172-252), University Microfilms order No.91-22395, Ph.D thesis. Refs. p.237-252.

Seismic body waveform and surface wave spectral amplitude modeling techniques are applied to the study of the seismotectonics of the Scotia Sea region. Focal mechanisms determined from P- and SH-waveform and amplitude inversion of 20 shallow earthquakes along the poorly understood tectonic boundaries in the Scotia Sea provide constraints on the relative plate motions in the region. Slip vectors from eight of the earthquakes studied were used in a 4-plate model to quantify the relative rates of motions along boundaries. Left-lateral transcurrent motion with a component of compression is predicted at a rate of 0.6 cm/yr along the North Scotia Ridge between the Scotia and South American plates. Left-lateral transcurrent motion with a component of extension is predicted at a rate of 1.0 cm/yr along the South Scotia Ridge between the Scotia and antarctic plates. (Auth. mod.)

E-48137

Meyer, D.L., Oji, T., **Eocene crinoids from Seymour Island, Antarctic Peninsula: paleobiogeographic and paleoecologic implications**, *Journal of paleontology*, Mar. 1993 67(2), p.250-257, 33 refs.

On the basis of recent collections from the Upper Eocene La Meseta Formation of Seymour I., the morphology, systematic position, taphonomy, and paleoecology of the isocrinid *Metacrinus fossilis* are investigated. A new species, *Notocrinus rasmusseni*, is described as the first comatulid crinoid known from the antarctic fossil record. The systematic assignment of *M. fossilis* is maintained. Basal abra-

sion of calyxes and absence of long attached columns suggest that *M. fossilis* might have lost most of the column in adult stages and lived directly on the substratum, supported by some arms and a few cirri, similar to comatulids. About 10% of *M. fossilis* individuals show brachial regeneration, in contrast to regeneration frequencies of 70-90% among modern Japanese isocrinids. The anomalous occurrence of isocrinids in shallow- water facies of La Meseta is attributed to a combination of reduced predation pressure, the presumed stalkless mode of life, and a favorable temperature regime in antarctic surface waters prior to the onset of cooling at the close of the Eocene. (Auth.)

E-48138

Marvin, U.B., MacPherson, G.J., **Field and laboratory investigations of antarctic meteorites collected by United States expeditions, 1985-1987. 1. Editors' introduction**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.1-3, 4 refs.

DLC QE1.S227 no.30

This is the fifth publication in the Smithsonian Contributions to the Earth Sciences series to present the results of the yearly United States Antarctic Search for Meteorites (ANSMET) expeditions to Antarctica. This issue describes the 1984-1985, 1985-1986, and 1986-1987 field seasons. Descriptions and classifications are given of most of the meteorites collected during those expeditions with the exceptions of types 4, 5, and 6 ordinary chondrites, whose properties are tabulated in the Appendix. Two articles are included that summarize data on the terrestrial ages and thermoluminescence properties of antarctic meteorites. Appendix Table A lists all meteorites classified through June 1987 in numerical order for each locality; Appendix Table B lists specimens in consecutive order by meteorite class; Appendix Table C summarizes the total numbers of meteorites collected by ANSMET through 1986, by type. (Auth.)

E-48139

Sandford, S.A., **1984-1985 antarctic search for meteorites (ANSMET) field program**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.5-9.

DLC QE1.S227 no.30

A tally of the expeditioners involved is given along with accounts of field camp life, the weather, meteorite search and processing procedures, and collection successes. An aerial photograph identifying prominent surface features and showing traverses made is included and a table gives precise locations of sites visited with inclusive visitation dates.

E-48140

Cassidy, W.A., **1985-1986 and 1986-1987 field seasons**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.11-16, 1 ref.

DLC QE1.S227 no.30

A brief summary is given of the collecting activities in the vicinity of Reckling Peak, Allan Hills, and Beardmore Glacier in the 1985-1986 season and at Lewis Cliff in the 1987 season. Insights are reported as to how and when teams traveled to the various camps where collections were made, their success at adding to the total of meteorites found, the state of the "Hard Times" camp near Coalsack Bluff, and the food cache found there.

E-48141

Mason, B., **Descriptions of stony meteorites**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.17-35, 31 refs.

DLC QE1.S227 no.30

This article gives descriptions of the achondrites, mesosiderites, and the more unusual chondrites (unique, carbonaceous, enstatite, and type 3 ordinary chondrites) collected during the 1984-1985, 1985-1986, and 1986-1987 field seasons. Summary data for the other ordinary chondrites are included in the Appendix. Within the carbonaceous and enstatite chondrites, the specimens are grouped according to the Van Schmus-Wood (1967) classification, and the descriptions follow the order of increasing petrographic type. The descriptions are based largely on those published in the *Antarctic Meteorite Newsletter*, with additional information as available. The letter-number designation conforms with the guidelines recommended by the Committee on Nomenclature of the Meteoritical Society, and carries the following information: location, field season, and XXX, digits indicating sequential number of the specimen. The original weight of the specimen is given to the nearest 0.1 gram. (Auth.)

E-48142

Clarke, R.S., Jr., **Descriptions of iron meteorites**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.37-43, 7 refs.

DLC QE1.S227 no.30

This section provides brief descriptions of four octahedrites, a group IAB silicate-rich specimen, and three anomalous meteorites. The descriptions are based on material prepared previously for the *Antarctic Meteorite Newsletter* and on recently published data. The specimens considered are listed with their weights and classifications in a table.

E-48143

Evans, J., Wacker, J., Reeves, J., **Terrestrial ages of Victoria Land meteorites derived from cosmic-ray-produced radionuclides**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.45-56, 31 refs.

DLC QE1.S227 no.30

Since 1979, assays have been conducted on antarctic meteorites for the cosmic-ray-produced radionuclide, Al-26. This nuclide is assayed rapidly and nondestructively by multiparameter gamma-ray spectroscopy. These measurements provide a basis for estimation of the terrestrial residence time of meteorites that have been collected on the antarctic ice sheet. While the Al-26 method alone cannot provide a completely reliable terrestrial age for individual samples, Al-26 data can be used to evaluate trends for large groups of samples and provide useful guidance for selecting samples for more detailed study by other methods. Other investigators have performed analyses for several other cosmic-ray-produced radionuclides on some of these same samples. In addition to Al-26, the isotopes studied and tabulated in this article include Mn-53, Be-10, Cl-36, and C-14. Very sophisticated and labor intensive techniques that involve complicated physical and chemical separations are used for those analyses. Mn-53 is measured by neutron activation while C-14, Be-10, and Cl-36 are measured by accelerator mass spectrometry. Previous issues of this publication have reviewed the status of cosmogenic radionuclide research on antarctic meteorites. This article updates that information and expands the database considerably with the addition of previously unreported information on 214 meteorites.

E-48144

Hasan, F.A., **Natural thermoluminescence levels and the recovery location of antarctic meteorites**, *Smithsonian contributions to the earth sciences*, 1992 No.30, Field and laboratory investigations of antarctic meteorites collected by United States expeditions 1985-1987, edited by U.B. Marvin and G.J. MacPherson, p.57-68, 24 refs.

DLC QE1.S227 no.30

In this article, the levels of natural thermoluminescence in 379 antarctic meteorites are reported; 86 samples were from the 1985 collection at the Allan Hills site, 88 were collected in the Lewis Cliff region during the 1985-1986 season and 165 were collected at the Lewis Cliff sites during the 1986-1987 field season. An additional four samples came from the Allan Hills site in 1986, and 36 came from six other ice fields. Details of the TL levels, locations, and age ranges are presented and compared.

E-48149

Yu, S.S., Green, W.J., Delanoy, G.A., **Vertical migration of chromium in Vanda saline lake of Wright Valley, Antarctica**, *Oceanologia et limnologia sinica*, Nov. 1992 23(6), p.591-598, In Chinese with English summary. 5 refs.

Lake Vanda, located in Wright Valley of Antarctica, is a saline lake with typical dimictic calcium chloride. This paper discusses the vertical geochemical distribution of chromium concentrations. In Lake Vanda's water, chromium exists in two valence states: Cr⁶⁺ and Cr³⁺. In oxygenated fresh lake water, chromium concentration is low and Cr⁶⁺ concentration predominates. In reduced brine, chromium concentration is high and Cr³⁺ concentration predominates. The important role of sinking particles in the vertical migration of chromium in lakewater is discussed. (Auth. mod.)

E-48157

Birkenmajer, K., **Lichenometric dating of a mid-19th century lava eruption on Deception Island (West Antarctica)**, *Polish Academy of Sciences. Bulletin. Earth sciences*, 1991 39(4), p.467-475, 24 refs.

Lichenometric dating of a young fissure-erupted basaltic lava at Mount Kirkwood, Deception I., gave an age of about 150 years. This coincides well with a report on sighting of strong volcanic eruption along the southern side of the Deception I. volcano in 1842. (Auth.)

E-48164

Byun, H., Yi, S., Yun, H., Chang, S.K., **Dinoflagellate cysts from surface sediments of the Bransfield Strait, Antarctica**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.35-58, Refs. p.43-46.

A total of 31 dinocyst and acritarch species and 1 dinocyst subspecies belonging to 25 genera are first described from surface sediments of the Bransfield Strait. The cyst assemblage is characterized by good preservation and relatively low abundance and diversity, although they vary considerably from station to station, indicating that dinoflagellate productivity primarily varied depending on location, and is modified by secondary factors such as postmortem transportation and fossilization. The species association is similar to some extent to that of the Bering Sea (Bujak, 1984). Frequently found were species from the Miocene or even late Cretaceous. Therefore, the reworking possibility of older sediments mixing with Holocene ones cannot be excluded. (Auth.)

E-48165

Lee, J.J., Oh, J.K., Han, M.W., Yoon, H.I., **Depositional processes of diatomaceous sediments in King George Basin, Bransfield Strait, Antarctica: sedimentary record of small-scale climate change**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.59-70, In Korean with English summary. Refs. p.68-70.

Geochemical data and sedimentary facies were analyzed in core sediments from northeastern Bransfield Strait, in the King George Basin off the Antarctic Peninsula, to determine climatic changes in the study area. The lower part of the cores KG-02 and KG-04, obtained within the basin and from the transition zone between the basin and the continental slope off the peninsula, are characterized by high biogenic silica content (up to 51%) and mud and diatomaceous layers. These appear to have been deposited during a small-scale glacial period, when multi-year sea ice would have advanced to the continental slope. The upper parts of the cores, however, do not show any changes in the biogenic silica content and sedimentary facies, indicating a warm climate condition similar to the present. The KG-05 core, from the transition zone between the continental slope and the shelf off the Antarctic Peninsula, lacks the characteristics of the lower parts of KG-02 and KG-04; it is rather similar to their upper parts. Adjacent to KG-05, the core DF 82-36 has, below the 300 cm depth, a markedly high content of coarse sediments of terrestrial origin with low biogenic silica; above this depth it is similar to KG-05. (Auth. mod.)

E-48166

Lee, D.Y., **Topographic evidences of raised beaches along the Barton Peninsula, Antarctica**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.71-84, In Korean with English summary. Refs. p.82-84.

During the 1991-92 antarctic summer field campaign, geomorphic features related with glacial isostasy were observed in Barton Peninsula and its surrounding coastal area of King George I., such as marine terraces, sea notches or beach deposits. The ancient beach deposits consist of well-rounded but slightly flat gravels. These outcrops are subdivided into 3 different series by their location and shapes. The lower series consist of the succession at the level of 3.1, 5.4, 6.0, 7.2, 14-15, 17-18 m. The middle series are characterized by ice-pushed reworked gravels at the level of 24-25, 32-33, 38-40, and 57-58 m. The upper series reach up to the level of 135 and 185 m. The age of the lower series must be Holocene, based on the level of the outcrop and the different gravel shape morphology, which is characterized by rounded or flat types. These are spherical at the lower altitude and flat at the higher level of the ancient beach. (Auth. mod.)

E-48167

Nam, S.H., Kim, Y., **Marine seismic survey off Brabant Island and in Gerlache Strait, Antarctic Peninsula**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.85-94, In Korean with English summary. 18 refs.

A seismic reflection survey using a water gun system was carried out in the Gerlache Strait during the 1991-92 field season to study its origin and the distribution of glacial deposits. The bottom of the Strait shows a very rugged topography almost free of sediments. This may result from erosion and transport by the strong current which flows to the northeast along the Gerlache Strait. A narrow valley at the northeast margin of the Strait is considered to be part of the western Sub-basin of Bransfield Strait which was formed by the Late Cenozoic back-arc extension. The southwestern part of Gerlache Strait adjacent to Anvers I. may be of glacial origin. (Auth.)

E-48172

Komiya, M., Shimoyama, A., Harada, K., **Examination of organic compounds from insoluble organic matter isolated from some antarctic carbonaceous chondrites by heating experiments**, *Geochimica et cosmochimica acta*, Feb. 1993 57(4), p.907-914, 25 refs.

Insoluble organic matter isolated from 5 antarctic CM2 chondrites was heated in a thermal analyzer from room temperature to 800 C in a helium atmosphere. Organic compounds from the thermal decomposition of the Yamato-791198 sample were studied by a gas chromatograph-mass spectrometer (GC-MS). The number of compounds identified was over 120, belonging mainly to the two following groups: (1) benzene and naphthalene, and their alkyl derivatives; and (2) sulfur-containing heterocycles and their alkyl derivatives. Small amounts of aliphatic hydrocarbons and nitriles were also detected. Relative amounts of compounds released from the 5 chondrite samples were monitored by the MS with increasing temperature. Yamato-74662 and Yamato-791198 showed organic compounds mainly over the temperature range of 300-600 C, while the other 3 (Yamato-793321, Yamato-86720, and Belgica-7904) did not show any, except small amounts of benzene. These results indicate that the insoluble organics in Yamato-74662 and Yamato-791198 possess a thermally labile organic fraction, whereas those in Yamato-793321, Yamato-86720, and Belgica-7904 do not and are graphitic. The difference between the insoluble organic fractions may be related to aqueous alteration and thermal metamorphism on the parent bodies. (Auth.)

E-48201

Charvis, P., **Deep structure beneath the northern Kerguelen Plateau** [Structure profonde du domaine nord du plateau de Kerguelen (océan Indien austral): résultats préliminaires de la campagne MD66/KeOBS], *Académie des sciences, Paris. Comptes rendus. Série II*, Feb. 4, 1993 316(3), p.341-347, In French with abridged English version. 19 refs.

During the MD66/KeOBS cruise five seismic refraction lines were shot over the Kerguelen Plateau using air guns as sources and ocean bottom seismographs (OBSs) as receivers. Crustal thickness (23 km) and velocity-depth behavior interpreted from refraction data for the northern Kerguelen Plateau suggest an oceanic origin; these characteristics, however, differ significantly from those beneath the Kerguelen Is. Results suggest that the Kerguelen Archipelago may not have been built on top of the Cretaceous Kerguelen Plateau, but rather that the northern Kerguelen Plateau is a wholly Cenozoic construction. (Auth.)

E-48239

Feldmann, R.M., Tshudy, D.M., Thomson, M.R.A., **Late Cretaceous and Paleocene decapod crustaceans from James Ross Basin, Antarctic Peninsula**, *Journal of paleontology*, Jan. 1993 67(1, Sup.) Part II, The Paleontological Society, Memoir 28, p.1-41, Refs. p.38-40.

Seventeen species of decapod crustaceans have been described from Campanian through Paleocene rocks in the Santa Marta, López de Bertodano, and Sobral Formations of the James Ross Basin. Of these, 9 are new species: *Metanephrops rossensis*, *Glyphea australensis*, *Paguristes santamartaensis*, *Munidopsis foersteri*, *Retrorsichela laevis*, *Plagiophthalmous collinsi*, *rhinopoupinia bicornis*, *Cristafrons praescientis*, and *Torynomma (Torynomma) australis*. One new family, Retrosichelidae, and 3 new genera, *Retrorsichela*, *Rhinopoupinia*, and *Cristafrons*, were also named. This assemblage includes the first notice of brachyurans from the Cretaceous of Antarctica; 6 species are described. The nephropid lobster *Hoploparia stokesi* (Weller), the most common decapod throughout the section, exhibits significant morphological change throughout its range from late Santonian or earliest Campanian to Paleocene; however, variation of key

features is asynchronous. The raninid brachyuran, *C. praescientis*, is second in abundance to *H. stokesi*. The occurrence of *Metanephrops rossensis* and *Munidopsis foersteri* represents the oldest geological records for these genera and the recognition of species of *Paguristes*, *Plagiophthalmous*, *Torynomma*, and *Necrocarcinus* constitutes the first notice of these genera in Antarctica. Of those taxa that have living congeners, the species of *Metanephrops*, *Linuparus*, and *Munidopsis* occupied habitats at inner shelf depths in the Cretaceous, whereas their extant descendants are restricted to outer shelf and bathyal depths. This diverse decapod fauna is dominated by genera that range into the Cenozoic and appears to be a pioneer assemblage. (Auth.)

E-48247

Flöttmann, T., Gibson, G.M., Kleinschmidt, G., **Structural continuity of the Ross and Delamerian orogens of Antarctica and Australia along the margin of the paleo-Pacific**, *Geology*, Apr. 1993 21(4), p.319-322, 26 refs.

The Delamerian orogen (southeast Australia) and the Wilson terrane (northern Victoria Land) constitute a formerly continuous lower Paleozoic fold-and-thrust belt developed along the paleo-Pacific margin of eastern Gondwana. Major folds and thrust faults in these regions, rooted in mid-crustal detachment zones, transported Cambrian-Ordovician granites and high-temperature low-pressure metamorphic rocks divergently toward their respective western craton margins and eastern orogen margins, and associated cover sequences. The structural imprints are related to the accretion of lower Paleozoic terranes at the eastern margin of the Delamerian orogen and the Wilson terrane. The continuity of the contemporaneous structure patterns in Australia and Antarctica is evidence for continuous convergent tectonism along the lower Paleozoic-Pacific margin of Gondwana. (Auth.)

E-48248

Goodge, J.W., Walker, N.W., Hansen, V.L., **Neoproterozoic-Cambrian basement-involved orogenesis within the antarctic margin of Gondwana**, *Geology*, Jan. 1993 21(1), p.37-40, 38 refs.

High-grade metamorphic tectonites of the Nimrod Group in the central Transantarctic Mountains compose a major ductile shear zone that formed within the paleo-Pacific margin of Gondwana. Despite demonstrated Precambrian protoliths, the timing of metamorphism and tectonite development has been poorly constrained. Igneous rocks of diverse compositions intrude the Nimrod tectonites. Four intrusive units with incipient to well-developed ductile fabrics yield U-Pb zircon ages of 541-521 Ma, and a nondeformed pegmatite has a U-Pb zircon age of about 515 Ma. These data show that early Paleozoic Ross magmatism was compositionally, texturally, and temporally more heterogeneous than previously recognized. Fabrics in the igneous rocks are concordant with those in their host tectonites, indicating that Nimrod tectonism was in part synchronous with plutonism. U-Pb ages of 525-522 Ma for metamorphic monazite from two pelitic tectonites support this interpretation. Thus, ductile deformation was in its peak to waning stages between about 540 and 520 Ma. This timing provides compelling evidence for transcurrent basement involvement in oblique plate convergence along the Neoproterozoic to Early Cambrian Antarctic margin of Gondwana. (Auth.)

E-48266

Hall, K.J., Walton, D.W.H., **Rock weathering, soil development and colonization under a changing climate**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.269-277, Refs. p.276-277.

DLC QH301.R648a

Antarctic continental soils are arid, saline and lacking in organic matter, whereas maritime soils, in a wetter environment, range from

structureless lithosols to frozen peat. Two important factors in the development and diversity of their associated terrestrial communities are water availability and the period of exposure since deglaciation. The retreat of ice sheets offers new sites for colonization by microbes, plants and animals. The interactions among snow lie, freeze-thaw cycles, wet-dry cycles and the length of the summer are considered as critical in determining the extent and rate of localized changes in weathering and pedogenesis. The implications of higher temperatures and differing precipitation regimes are considered in relation to weathering, soil development and the establishment and development of terrestrial communities. It is concluded that, in the context of decades, most changes will be slow and localized. They are unlikely to be of regional significance, unlike some of those in the Arctic. They will, however, provide a good model of how present soils and communities developed at the end of the last glacial maximum.

E-48275

Maurette, M., Pourchet, M., De Angelis, M., **Micrometeorites from Cap Prudhomme** [Les micrometeorites de Cap Prudhomme], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.25-40, In French with English summary.

During two months of field operations near Cap Prudhomme in Antarctica, 100 tons of melted ice water were filtered on a stack of stainless steel sieves, yielding about 5,000 unmelted grains and 5,000 melted spherules with a chondritic composition, size >0.05 mm. Neon isotopic measurements of individual unmelted grains size 0.1 mm indicate that they are genuine micrometeorites. Mineralogical studies, as well as microanalyses with techniques of high voltage electron microscopy, show that the new Cap Prudhomme micrometeorites are different from the constituent material of both meteorites and interplanetary dust particles collected in the stratosphere. They would represent a much larger variety of solar system objects, including comets, than meteorites. (Auth. mod.)

E-48285

Bartek, L.R., Sloan, L.C., Anderson, J.B., Ross, M.I., **Evidence from the antarctic continental margin of Late Paleogene ice sheets: a manifestation of plate reorganization and synchronous changes in atmospheric circulation over the emerging southern ocean?**, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.131-159, Refs. p.154-159.

DLC QE737.E53

Results from parametrically modelled simulations of southern ocean paleoclimates suggest that the development of the East Antarctic ice sheet may have been triggered by the opening of a seaway between Antarctica and Australia during late Cretaceous/early Paleogene time. The development of a seaway between the two continents decreased the continentality of the region and resulted in onshore transport of moist air over Antarctica. Transport of moisture over the cold antarctic continental landmass resulted in precipitation and the formation of antarctic ice sheets by at least late Paleogene time. Widespread erosion of the continental shelf and shelf overdeepening occurred when the ice advanced onto the Ross Sea continental shelf during late Oligocene time. It is hypothesized that metastable marine-based ice sheets have waxed and waned on the Ross Sea continental shelf since the Oligocene grounding event. These results are at least in part supported by results from an atmospheric general circulation model. (Auth. mod.)

E-48286

Miller, K.G., **Middle Eocene to Oligocene stable isotopes, climate, and deep-water history: the terminal Eocene event?**, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.160-177, Refs. p.174-177.

DLC QE737.E53

The "Terminal Eocene Event" in the marine realm is comprised of a sequence of events that record the climate transition from peak early Eocene warmth to cold, glaciated Oligocene conditions. The sources of middle to late Eocene deep and bottom waters are not clear. Seismic stratigraphic evidence and the distribution of hiatuses indicate generally sluggish circulation at this time. Carbon isotope evidence for deep-water sources is equivocal because of poor Pacific Ocean sections. Seismic stratigraphic evidence and the development of widespread hiatuses indicate vigorous deep-water circulation during the early Oligocene both from the Arctic/North Atlantic and Antarctic. Carbon and oxygen isotope data are consistent with a short pulse of Northern Component Water (NCW) during the earliest Oligocene (ca. 35.5-34.5 Ma) together with input of cold Southern Component Water (SCW). This deep-water change is associated with the earliest Oligocene $\delta^{18}O$ increase, suggesting a link between deep water and climate changes. (Auth. mod.)

E-48287

Keller, G., MacLeod, N., Barrera, E., **Eocene-Oligocene faunal turnover in planktic foraminifera, and antarctic glaciation**, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.218-244, Refs. p.240-244.

DLC QE737.E53

Low-latitude planktic foraminiferal populations experienced a major faunal turnover between the late-middle to early-late Oligocene. This faunal turnover involved over 80% of planktic foraminiferal species and took place quasi-continuously over an interval of approximately 14 m.y. Stable isotope records and glaciomarine sediments from high-latitude southern ocean ODP Legs 113 and 119 provide evidence of major glaciation on East Antarctica during the late middle to late Eocene and early Oligocene. Carbon and oxygen isotopic gradients for planktic and benthic foraminiferal species reflect decreasing surface productivity and thermal stratification during this time. The remarkably close correspondence between these stable isotope records and planktic foraminiferal turnovers strongly suggests that changes in climate and productivity were the primary driving forces behind the gradual decline and eventual extinction of the Eocene planktic foraminiferal fauna.

E-48288

Thomas, E., **Middle Eocene-Late Oligocene bathyal benthic foraminifera (Weddell Sea): faunal changes and implications for ocean circulation**, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.245-271, Refs. p.261-266.

DLC QE737.E53

Lower bathyal benthic foraminiferal faunas from Maud Rise (Weddell Sea) underwent gradual but stepped extinctions from middle Eocene through Oligocene, with steps at about 46.4-44.6 Ma, 40-37 Ma, and 34-31.5 Ma. Faunal changes at these high latitudes encompassed decreasing diversity and increasing relative abundance of epifaunal species, in combination with loss of large, heavily calcified *Bulimina* species (first step), followed by the disappearance of all *Bulimina* species and the appearance of *Turritina alsatica* (second step), followed by a strong decrease in abundance of *T. alsatica*, resulting in faunas dominated by *Nuttallides umbonifera* (third step).

These faunal changes may reflect the reaction of the fauna to gradual cooling (and thus a gradual increase in corrosiveness) of the high-latitude lower bathyal waters. The gradual nature of the faunal changes in lower bathyal benthic foraminiferal assemblages and the absence of catastrophic extinctions (on Maud Rise, as well as worldwide) suggest that the psychrosphere was established as a result of gradual cooling of surface waters at high latitudes, and that lower bathyal waters were formed by cooling and sinking at high latitudes during the middle Eocene through Oligocene. (Auth.)

E-48289

Baldauf, J.G., **Middle Eocene through Early Miocene diatom floral turnover**, Eocene-Oligocene climatic and biotic evolution. Edited by D.R. Prothero and W.A. Berggren, Princeton, Princeton University Press, 1992, p.310-326, Refs. p.325-326.

DLC QE737.E53

A database of occurrence data from the southern ocean, the low-latitude Atlantic and Pacific, the Labrador Sea and the Norwegian-Greenland Sea was developed to determine the spatial and temporal response of the diatom flora to oceanographic and climatic changes during the Paleogene and early Neogene. This database provides insight on periods of floral turnover. Four events, exhibiting greater than 30% turnover of the diatom flora, are identified and include the middle Eocene (41-43 Ma), the latest Eocene-earliest Oligocene (about 35-37 Ma), the latest Oligocene-earliest Miocene (25-23 Ma), and the late early Miocene (17-19 Ma). The latest Eocene to earliest Oligocene event represents about a 40% turnover for the assemblage, equally partitioned between the number of first occurrences and the number of last occurrences. This event corresponds to expansion of biosiliceous sediment in the southern high latitudes, and most likely represents a floral response to development of the antarctic cryosphere and further intensification of floral provincialism. (Auth. mod.)

E-48294

Menot, R.P., **Geological research on Adélie Coast** [Recherches géologiques en Terre Adélie: bilan et perspectives], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.36-43, In French with English summary. 10 refs.

This paper sums up the present state of geological knowledge on Adélie Coast. After a review of earlier publications, preliminary results of recent field investigations are summarized, including the metamorphic polycyclic evolution of the Adélie Coast crystalline basement. Two main metamorphic events, under deep-seated crustal conditions, occurred during Archean up to Mid Proterozoic times. (Auth. mod.)

E-48301

Cox, S.C., **Inter-related plutonism and deformation in south Victoria Land, Antarctica**, *Geological magazine*, Jan. 1993 130(1), p.1-14, Refs. p.13-14.

The Lower Palaeozoic Bonney Pluton is a regionally extensive coarse-grained, variably megacrystic, monzodioritic to granitic body that crops out over 1000 sq km in south Victoria Land. It intruded upper amphibolite facies Koettlitz Group metasediments and interlayered orthogneisses. Magmatic fabrics are developed in the center of the pluton by flow alignment of K-feldspars before the majority of phases had crystallized, whereas solid-state fabrics developed in the pluton margins by ductile-plastic deformation. Structures developed in the host-rocks vary around this elongate northwest-southeast trending pluton. Upright, tight northwest-southeast trending macroscopic folds are developed at the sides of the pluton, with axis-parallel stretching lineations and boudinage indicating strong northwest-southeast extension. Broad warps of tight macroscopic folds, and mesoscopic refolded folds, sheath folds and complicated interference

patterns characterize areas at the ends of the pluton. Emplacement of the pluton involved radial expansion in a regional northeast-southwest compression, and growth predominantly in the northwest-southeast direction. (Auth. mod.)

E-48330

Kerry, E., **Bioremediation of experimental petroleum spills on mineral soils in the Vestfold Hills, Antarctica**, *Polar biology*, Apr. 1993 13(3), p.163-170, 23 refs.

The effect of nutrient and water enhancement on the biodegradation of petroleum was tested in antarctic mineral soils. Significantly lower hydrocarbon concentrations were recorded after one year in soils treated with fertilizer solutions, but only in the surface 3 cm. These soils also showed lowered heptadecane/pristane and octadecane/phytane ratios, and had the highest levels of microbial activity relative to other plots. Soils treated with gum xanthan or covered with plastic had the highest residual hydrocarbon levels. Both treatments inhibited evaporative loss of hydrocarbon, and there were indications that gum xanthan was utilized by the microbiota as an alternative carbon source to distillate. Higher temperatures were recorded under the plastic, but no stimulation of biodegradation was detected. (Auth. mod.)

E-48344

Scott, E.R.D., Keil, K., Stöffler, D., **Shock metamorphism of carbonaceous chondrites**, *Geochimica et cosmochimica acta*, Dec. 1992 56(12), p.4281-4293, 57 refs.

Shock effects in carbonaceous chondrites were studied using optical microscopy of thin sections; petrographic classification of progressive shock metamorphism in ordinary chondrites can also be applied to carbonaceous chondrites. Sixty-nine carbonaceous chondrites can be assigned to four shock stages, S1 to S4, largely on the basis of shock effects in olivine. The least shocked chondrite groups are CM2 and CO3; 36 out of 38 members are classified as shock stage S1 (<5 GPa), the remainder are stage S2 or S3. The most strongly shocked groups are CK4-6 and CV3, which both have more than half their members in shock stages S2 and S3; the remainder are mostly stage S1. Two carbonaceous chondrites of shock stages S4 were found but none of stages S5 and S6. Opaque shock veins and melt pockets were observed in the two stage S4 chondrites, Efremovka (CV3) and EET 83111 (CK5), and a stage S3 chondrite, LEW 87009 (CK6); this is consistent with the distribution of impact melt in ordinary chondrites. Some carbonaceous chondrites appear to be breccias of material shocked to diverse shock stages prior to assembly of the material. For example, Murchison (CM2) appears to be a mixture of stage S1 and S2 material. (Auth. mod.)

E-48362

Dunbar, R.B., Mucciarone, D.A., Leventer, A., **Sediment-trap experiments in the central and western Ross Sea, January and February 1990**, *Antarctic journal of the United States*, 1991 27(5), p.115-117, 2 refs.

As part of an interdisciplinary, multi-institutional study of carbon and silica cycles, drifting and moored arrays of particle interceptor traps were deployed at three sites in the central and western Ross Sea during Jan./Feb. 1990. Material entering the traps consisted of biogenic opal, silica, organic carbon, diatoms, and fecal pellets. Site A had the greatest biogenic fluxes while Site B recorded the least, with Site C intermediate between those two. There was large spatial and temporal variability in the magnitude and style of the vertical biogenic sediment flux.

E-48365

Anderson, J.B., **Preliminary results of high-resolution seismic and coring surveys in the Antarctic Peninsula region**, *Antarctic journal of the United States*, 1991 27(5), p.123-126.

Approximately 2,000 km of high-quality seismic reflection data and 10 piston cores were acquired during U.S. Antarctic Program 1991 cruise PD91 aboard the R/V *Polar Duke* in the vicinity of the Antarctic Peninsula. Digital data were obtained using a single channel Teledyne streamer. Seismic surveys in bays and fiords were conducted using a 15-cubic inch water gun. Shelf surveys were conducted using a Hamco (100-cubic inch) water gun and the smaller T-water gun, fired at 3 and 6 seconds, respectively.

E-48368

McClennen, C.E., Domack, E.W., **Depositional patterns examined through 3.5- and 12- kilohertz records from fjords, passages, straits, and inner shelf west of the Antarctic Peninsula**, *Antarctic journal of the United States*, 1991 27(5), p.130-131.

Depositional patterns measured from cruise 90-7 of R/V *Polar Duke* are discussed. The areas of study were Croker Passage, Brailmont Cove, Hughes Bay, Gerlache Strait, Charlotte Bay, Dallman Bay, Fournier Bay, Lapeyrère Bay, Andvord Bay, Flandres Bay, Bismarck Strait and Lallemand Fjord. Over much of the survey area, the seabed appears to have little or no postglacial sediment accumulation. The lack of seismic layering, combined with an irregular, rough, somewhat rounded relief of 20 to 100 m, suggests ice-contact glacial deposition. In other areas with sharper relief, bedrock exposure is suspected. Seismically layered deposits are most vivid in basins within the bays, fjords, and straits and on the inner continental shelf where sediment ponding over 70 m thick has been observed. In a few selected areas there appear to be gas wipe-outs of the subbottom reflectors, a condition which is confirmed by the degassing of some piston cores collected from thick surficial sediments. Outside of the basins, layered sediments draped on some gently sloping segments of the sea floor were also noted.

E-48369

Keller, R.A., Fisk, M.R., White, W.M., **Chemistry of Quaternary volcanism in the Bransfield Strait and South Shetland Islands: preliminary results**, *Antarctic journal of the United States*, 1991 27(5), p.132-133, 13 refs.

Numerous locations of geologically young, and in some cases historically active, volcanism are known in the Bransfield Strait and parts of the South Shetland Is. These volcanoes are Quaternary in age, and judging from their locations and geochemistry in comparison to the older volcanic rocks that form the bulk of the South Shetland Is. and the Antarctic Peninsula, it is concluded that they are associated with the young rift that has created the Bransfield basin. 1990 marked the completion of most phases of a geochemical and petrological investigation of the young volcanoes to investigate the sources and processes responsible for their eruption. Some preliminary interpretations are offered.

E-48370

Wei, W.C., Pospichal, J.J., Wise, S.W., Jr., **Cenozoic calcareous nanofossil magnetobiochronology of the southern oceans: a summary**, *Antarctic journal of the United States*, 1991 27(5), p.134-138, 40 refs.

Accurate biostratigraphic correlations between the southern oceans and lower latitude areas are critical for global paleoceanographic studies, but until recently, such correlations have been difficult or impossible. Ocean Drilling Program (ODP) legs 113, 114, 119, 120, and 121 recently recovered a number of fairly long and undisturbed Cenozoic sections from the southern oceans. These sections contain generally abundant calcareous nanofossils and have yielded detailed magnetostratigraphies. Discussions of Cenozoic nanofossil biomagnetostratigraphic correlation for different sections from these five ODP legs have been presented recently in a number of papers. This article provides a brief summary of these results and presents a composite Cenozoic biomagnetostratigraphic section that

shows the nanofossil zones, datums, and their ages in the southern oceans along with a comparison with those in the mid-latitudes. Data sources used in this synthesis are listed in a table.

E-48394

Moncrieff, A.C.M., Kelly, S.R.A., **Lithostratigraphy of the uppermost Fossil Bluff group (Early Cretaceous) of Alexander Island, Antarctica: history of an Albian regression**, *Cretaceous research*, Feb. 1993 14(1), p.1-15, 29 refs.

The Fossil Bluff Group of southeast Alexander I. contains strata ranging from Kimmeridgian to Albian in age, and represents the infill of a forearc basin to the west of the Antarctic Peninsula volcanic arc. Recent field work has identified approximately 2800 m of younger rock above the 4000 m already defined, including the top of the previously described Pluto Glacier Formation. A new unit, the Rhea Corner Member, is defined near the top of the Pluto Glacier Formation. The sequence above this is named as the Neptune Glacier Formation, comprising three members, the Deimos Ridge, Triton Point and Mars Glacier members. They represent the youngest part of the Fossil Bluff Group. Both the Deimos Ridge and Mars Glacier members are fully marine, but the Triton Point Member, which is late Albian in age, contains the only record of emergent conditions in 6.8 km of strata. It is a fluvial unit and contains extensive fossil forest horizons, with standing trees up to 5 m tall preserved by widespread flood deposits. The Neptune Glacier Formation therefore records a significant regression-transgression cycle of Albian age. (Auth.)

E-48399

Langenauer, M., Krähenbühl, U., **Depth-profiles and surface enrichment of the halogens in four antarctic H5 chondrites and in two non-antarctic chondrites**, *Meteoritics*, Mar. 1993 28(1), p.98-104, 35 refs.

Depth profiles of F, Cl, Br and I concentrations were determined in four different antarctic H5 chondrites from the Allan Hills and in the two chondrites Allende (C3) and Holbrook (L6). Pieces of the meteorites were studied by analysis of stepwise-removed layers of 0.5-1.0 mm thickness up to a depth of 9 mm. Neutron activation analysis and ion-selective potentiometry were used for the determination of Cl, Br, I and for F, respectively. The antarctic meteorites show higher concentrations of the halogens at the surface compared to the interior. The highest enrichment factors are found for I and Cl and the lowest for Br. In contrast, F shows the steepest concentration gradient and is only enriched in the first 2.5 mm below the surface. The other halogens have penetrated deeper into the meteorites. The measured enrichments at the surfaces are not correlated to the visible degree of weathering. The analyzed non-antarctic meteorites, which were recovered shortly after their observed fall, demonstrate similar halogen concentrations at the surface, including the fusion crust, as in the interior. Based on these results the authors present a model to estimate the degree of contamination and the relation to the duration of exposure at the surface of the antarctic ice. (Auth.)

E-48400

Delisle, G., Franchi, I., Rossi, A., Wieler, R., **Meteorite finds by EUROMET near Frontier Mountain, north Victoria Land, Antarctica**, *Meteoritics*, Mar. 1993 28(1), p.126-129, 6 refs.

A team from EUROMET (a joint initiative of scientific institutions in Europe interested in meteorites) was sent for the first time to Antarctica in the 1990/91 season to undertake a systematic search for meteorites. The project was organized within the framework of the Italian Antarctic Program (Programma Nazionale di Ricerca in Antartide, PNRA). The search was carried out in the vicinity of Frontier Mountain, where 256 meteorite fragments were discovered, most of which were wind-blown across the blue-ice field to the NE of

Frontier Mountain and finally caught in an ice depression about 5 km to the N. The larger meteorites which remained on the ice surface from which they were uncovered may have been transported down to the mountain edge where they have subsequently been destroyed or covered in debris. A search for meteorites at neighboring Sequence Hills, where similar glaciological conditions exist, proved unsuccessful. At this location the surface of the blue ice in the valleys with suspected meteorite concentrations was covered by meltwater lakes.

E-48412

Yanai, K., **Antarctic meteorites**, *Polar news*, Mar. 1992 No.54, p.12-21, In Japanese.

Discoveries of meteorites in Antarctica are summarized. The first meteorite was discovered in Antarctica in 1912, no more until 1961, and then 26 more during 1961-1973. From 1974 through 1990, more than 14,500 meteorites were discovered in Antarctica. Of those, about 8700 were discovered by Japanese, about 5300 by Americans, and about 500 by others. Only about 2500 meteorites have been discovered throughout the world outside Antarctica. Most of the antarctic meteorites are found on bare ice fields where the ice sheet is obstructed by mountain ridges. It is suggested that meteorites which have fallen into, been buried, and transported by the ice sheet, accumulate there and are exposed by ablation.

E-48433

Kuhn, G., Melles, M., Ehrmann, W.U., Hambrey, M.J., Schmiedl, G., **Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica**, *Journal of sedimentary petrology*, May 1993 63(3), p.477-487, 31 refs.

The gravel component in marine sediments on the continental margin of Antarctica is almost entirely from transport by grounded ice, ice shelves, ice tongues, and icebergs. About 2000 gravel clasts from about 40 sites were examined for roundness, Zingg shape, and Krumbein sphericity. Surface characteristics, like faceting, striations, and other specific glaciogenic shapes, were recorded together with lithology. The samples were from both shallow and deep waters along >1500 km of the antarctic margin bordering the eastern Weddell Sea and Lazarev Sea. In addition, onshore observations were made in ice-marginal areas at Schirmacher Oasis. Few systematic differences in clast shape in modern sediments could be detected among the various glaciological environments; variation in shape within a given environment is greater than that between different environments. Abrasion of clasts at the interface between glacier and bedrock, before transport into the ocean, is less important than in temperate regions. This reflects the cold thermal regime of antarctic glaciers, a view confirmed by the similarity in shape of debris from basal ice and from sandy basal tills at Schirmacher Oasis. More angular debris was recovered off grounded-ice margins in Coats Land, but given the absence of supraglacial sources, this debris seems to be the product of rock fracturing at a relatively dry frozen ice bed. More than half, and sometimes nearly all, the clasts are faceted. Faceting, roundness, and sphericity are independent of lithology. In contrast, striae on clasts are strongly dependent on lithology: few gneissic clasts have striae, but nearly half the clasts of fine-grained basic igneous or metavolcanic rocks are striated. Each area studied has a distinct population of rock types of limited variety, suggesting that deposition is predominantly from the nearest land-ice source, and that mixing of sediment with that from far-traveled icebergs is negligible. (Auth.)

E-48440

Dirks, P.H.G.M., Carson, C.J., Wilson, C.J.L., **Deformational history of the Larsemann Hills, Prydz Bay: the importance of the Pan-African (500 Ma) in East Antarctica**, *Antarctic science*, June 1993 5(2), p.179-192, Refs. p.191-192.

The Larsemann Hills represents a low-pressure granulite terrain with a complex structural-metamorphic history that comprises two parts: granulite facies D1 structures transposed within an early form surface that probably formed at 1000 Ma, and a sequence of progressive, upper amphibolite to lower granulite facies D2-D6 structures that formed during the Pan-African at 500 Ma and were associated with the emplacement of granites and pegmatites with high-grade alteration zones. D2-D6 events comprise an early form surface that has been tightly folded and sheared twice after which it was warped and transected by discrete mylonites. D2-D6 assemblages are associated with decompression textures on D1 peak-assemblages, such as cordierite coronas on garnet + sillimanite in metapelite and plagioclase coronas on garnet in metabasite. This suggests that D2-D6 formed at slightly lower pressures than D1 structures. Although the Larsemann Hills are small in area, they are representative of a great many granulite terrains in East Antarctica, which suggests that great care is needed in the structural-metamorphic analysis of such terrains to ensure the separation of tectonic stages before an interpretation of the tectonic path is attempted. (Auth. mod.)

E-48441

Kinny, P.D., Black, L.P., Sheraton, J.W., **Zircon ages and the distribution of Archaean and Proterozoic rocks in the Rauer Islands**, *Antarctic science*, June 1993 5(2), p.193-206, 33 refs.

The application of zircon U-Pb geochronology, using the SHRIMP ion microprobe, to the Precambrian high-grade metamorphic rocks of the Rauer Is. has resulted in major revisions to the interpreted geological history. Large tracts of granitic orthogneisses, previously considered to be mostly Proterozoic in age, are shown here to be Archaean, with crystallization ages of 3270 Ma and 2800 Ma. These rocks and associated granulite-facies mafic rocks and paragneisses account for up to 50% of exposures in the Rauer Is. Unlike the 2500 Ma rocks in the nearby Vestfold Hills which were cratonized soon after formation, the Rauer Is. rocks were reworked at about 1000 Ma under granulite to amphibolite facies conditions, and mixed with newly generated felsic crust. Dating of components of this felsic intrusive suite indicates that this Proterozoic reworking was accomplished over some 30-40 million years. The geology of the Rauer Is. reflects reworking and juxtaposition of unrelated rocks in a Proterozoic orogenic belt, and illustrates the important influence of relatively low-grade fluid-rock interaction on zircon U-Pb systematics in high-grade terranes. (Auth. mod.)

E-48442

Lodolo, E., Camerlenghi, A., Brancolini, G., **Bottom simulating reflector on the South Shetland margin, Antarctic Peninsula**, *Antarctic science*, June 1993 5(2), p.207-210, 13 refs.

Multichannel seismic data acquired over the northern Pacific margin of the Antarctic Peninsula have shown the presence of high-amplitude sub-bottom reflections across part of the South Shetland accretionary prism. Detailed seismic data analysis, such as true amplitude signal recovery, reflection coefficient determinations and closely-spaced semblance velocity analysis, have been carried out in order definitely to assign this bottom simulating reflector to the base of the stability field for methane hydrate. This represents the first evidence of gas hydrate layers in the Antarctic Peninsula region. (Auth.)

E-48443

Woolfe, K.J., **Devonian depositional environments in the Darwin Mountains: marine or non-marine?**, *Antarctic science*, June 1993 5(2), p.211-220, Refs. p.219-220.

The depositional environment of the Devonian Taylor Group has been subject to considerable debate for over 30 years. The debate stems largely from a belief that the abundant and diverse trace fossils represent a marine ichnofauna, whereas sedimentary features, includ-

ing palaeosols, desiccation polygons and red beds, are more typical of a non-marine setting. The debate is reconciled by a reinterpretation of the trace fossil assemblage which shows that the trace fossils comprise a typical fresh water (*Scoyenia* ichnofacies) assemblage, and their occurrence in the Taylor Group in the Darwin Glacier area is entirely consistent with deposition in a mixed fluvial-lacustrine-subaerial environment. (Auth.)

E-48448

Stephenson, N.C.N., Cook, N.D.J., **High K/Na alkaline mafic dykes near Radok Lake, northern Prince Charles Mountains, East Antarctica**, *Lithos*, Dec. 1992 29(1/2), p.87-105, Refs. p.103-105.

Thin mafic dykes emplaced in ca. 1000 Ma granulite-facies basement and Permian Amery Group strata around Radok Lake, northern Prince Charles Mountains, are high K/Na alkaline andesites or basalts. They include 3 petrographic groups: plagioclase +/- olivine-phyric, clinopyroxene +/- olivine-phyric, and aphyric dykes. Clinopyroxene "phenocryst" dykes comprise low-P phenocrysts, xenocrysts of possible mantle derivation, and probably high-P cognate phenocrysts. Incompatible element ratios separate the dykes into 3 or 4 groups broadly, though not exactly, coinciding with the petrographic subdivision. The dykes have 100 Mg/(Mg+Fe²⁺) ratios and Ni and Cr abundances too low for primary magmas derived from commonly envisaged upper mantle peridotite sources. Instead, they could represent either primary magmas derived from relatively Fe-rich mantle, or be the products of pre-emplacement fractional crystallization of olivine and clinopyroxene from more Mg-rich parental magmas. The high incompatible-element and REE abundances of the dykes suggest that their mantle sources were either undepleted or re-enriched, and that the degree of melting was probably small. (Auth. mod.)

E-48449

Santosh, M., Yoshida, M., **Petrologic and fluid inclusion study of charnockites from the Lützow-Holm Bay region, East Antarctica: evidence for fluid-rich metamorphism in the lower crust**, *Lithos*, Dec. 1992 29(1/2), p.107-126, Refs. p.124-126.

The Proterozoic terrain of Lützow-Holm Bay comprises an amphibolite- to granulite-facies progression from north to south, exposing an oblique section of the lower crust. The granulite terrain is represented dominantly by orthopyroxene-bearing anhydrous granulites (charnockites), garnet- and biotite-bearing gneisses (leptynites), and garnet, sillimanite and graphite bearing aluminous metapelites (khondalites). Thus it is petrographically identical with its Gondwanian counterparts in Sri Lanka and southern India. A number of mineral-reaction textures, including orthopyroxene-plagioclase symplectites around clinopyroxene relics in intermediate charnockites and spinel rims between adjacent garnet and sillimanite in khondalites, suggest near-isothermal conditions of equilibration. A mineral phase equilibria barometry traverse across the granulite terrain indicates an increase in pressure from c. 5 kbar in the north to c. 8-9 kbar in the south. The temperature gradient of c. 100 C is less pronounced. Fluid inclusion studies indicate abundant CO₂ trapped within the charnockite minerals. The Gondwanan Lützow-Holm Bay terrain had undergone substantial extension during the late Proterozoic, with displacement along megafaults and emplacement of several alkaline-subalkaline granite and syenite plutons, and also K-basalts. It is therefore envisaged that the abundant CO₂ in the charnockites could have been derived from an attenuated continental lithosphere, and transferred through magmatic conduits. (Auth. mod.)

E-48453

Miura, Y., Nagao, K., Fujitani, T., **Kr-81 terrestrial ages and grouping of Yamato eucrites based on noble gas and chemical compositions**, *Geochimica et cosmochimica acta*, Apr. 1993 57(8), p.1857-1866, Refs. p.1865-1866.

The ages and the groupings of Yamato eucrites recovered in Antarctica, as well as terrestrial ages of nine Yamato eucrites, were determined based on cosmic-ray produced noble gases, including the radionuclide Kr-81. The terrestrial ages of Y-792511, Y-793164, and Y-794043 are 0.14, 0.11, and 0.28 Ma, respectively. Due to the relatively long storage time in ice, the Ce anomaly caused by the terrestrial alteration was significant in these three eucrites. Short terrestrial ages of <0.08 Ma and long cosmic-ray exposure ages of about 65 Ma, as well as similar noble gas and REE compositions for six eucrites, Y-75011, -791826, -793547, -793548, -793570, and -794002, strongly suggest that they belong to a single fall. For these eucrites, negative Eu anomalies were found. In view of the data of Yamato eucrites previously reported, one or more fall(s) are required for monomict and 5 or more falls for polymict eucrites during the past 0.3 Ma. Fissionogenic Xe from Pu-244 was observed in nine eucrites, in which the concentration of Pu-244 at the beginning of Xe retention was calculated to be (0.5-2.2) ppb. (Auth. mod.)

E-48462

Bogard, D., **Antarctic polymict eucrite Yamato 792769 and the cratering record on the HED parent body**, *Geochimica et cosmochimica acta*, May 1993 57(9), p.2111-2121, 27 refs.

Yamato Y792769 is a polymict breccia containing pyroxenes of a limited range in chemical compositions. Compared to most other Yamato polymict eucrites, Y792769 includes fewer and smaller eucritic clasts with homogenized pyroxenes. Its fine-grained matrix is shock-compacted and sintered. The time of the last thermal event, which produced this texture and formed the breccia, is determined by the well-defined Ar-39/Ar-40 age of 3.99 +/- 0.04 Ga. The complete resetting of the Ar-39/Ar-40 age is consistent with the texture of Y792769, as viewed in the transmission electron microscope (TEM), which suggests shock compaction converted part of the matrix plagioclase to maskelynite. Sm-Nd data define an apparent isochron corresponding to an age of 4.23 +/- 0.12 Ga. Sm-Nd data for relict pyroxenes fall on a 4.56-Ga Sm-Nd reference isochron and on or above a 4.56-Ga Rb-Sr reference isochron, suggesting slight loss of rubidium during breccia formation. The pyroxene data are most suggestive of a "conventional" ca. 4.56 Ga age for the protolith rocks. The 3.99 Ga Ar-39/Ar-40 age predates the accepted age of formation of the lunar Imbrium and Serenitatis basins, but probably reflects a period of intense meteoroid bombardment that affected the entire inner solar system. (Auth.)

E-48465

Stefano, J.E., **Application of ground-penetrating radar at McMurdo Station, Antarctica, U.S. Department of Energy. Report**, [1992] ANL/CP-75281, 17p., DE92-010902, 5 refs.

Argonne National Laboratory initiated a site investigation program at McMurdo Station to characterize environmental contamination. The performance and usefulness of ground-penetrating radar (GPR) was evaluated under antarctic conditions during the initial site investigation in Jan. 1991. Preliminary surveys were successful in defining the contact between reworked pyroclastic material and the prefill, undisturbed pyroclastics and basalts at some sites. No interference from radio traffic at McMurdo Station was observed, but interference was a problem in work with unshielded antennas near buildings. In general, the results of this field test suggest that high-quality, high-resolution, continuous subsurface profiles can be produced with GPR over most of McMurdo Station. (Auth.)

E-48471

Keller, G., **Cretaceous-Tertiary boundary transition in the antarctic ocean and its global implications**, *Marine micropaleontology*, Apr. 1993 21(1/3), p.1-45, Refs. p.43-45.

Three antarctic ocean K/T boundary sequences from ODP Site 738C on the Kerguelen Plateau, ODP Site 752B on Broken Ridge, and ODP Site 690C on Maud Rise, Weddell Sea, have been analyzed for stratigraphic completeness and faunal turnover based on quantitative planktic foraminiferal studies. Results show that Site 738C, which has a laminated clay layer spanning the K/T boundary, is biostratigraphically complete with the earliest Tertiary Zones P0 and P1a present, but with short intrazonal hiatuses. Site 752B may be biostratigraphically complete and Site 690C has a hiatus at the K/T boundary with Zones P0 and P1a missing. Latest Cretaceous to earliest Tertiary planktic foraminiferal faunas from the antarctic ocean are cosmopolitan and similar to coeval faunas dominating in low, middle and northern high latitudes, although a few endemic species are present. This allows application of the current low and middle latitude zonation to antarctic K/T boundary sequences. There is no evidence of a sudden mass killing of the Cretaceous fauna associated with a bolide impact at the K/T boundary. Instead, the already declining Cretaceous taxa increase in relative abundance coincident with the evolution of the first new Tertiary species. (Auth. mod.)

E-48477

Feldmann, R.M., **Genus *Lyreidus* de Haan, 1839 (Crustacea, Decapodoa, Raninidae): systematics and biogeography**, *Journal of paleontology*, Nov. 1992 66(6), p.943-957, 47 refs.

Six extant and nine fossil species of the raninid *Lyreidus* de Haan, including *Lyreidus (Lyreidus) lebuensis* n. sp. and *L. (Lysirude) hookeri* n. sp., are recognized. Based on morphology of the anterolateral margin and sternum, the species are referred to two subgenera, *Lyreidus (Lyreidus)* and *Lyreidus (Lysirude)*. The genus first appears in shallow-water, high-latitude Southern Hemisphere localities in New Zealand, Antarctica, and Chile in the early Eocene. Subsequently, the nominate subgenus is confined to the Southern Hemisphere until the Neogene, when it dispersed into the Indo-West Pacific region. *Lyreidus (Lysirude)* is documented by early and middle Eocene occurrences in Antarctica and New Zealand; however, all subsequent occurrences, fossil and recent, are in the Northern Hemisphere. The disjunct modern distribution within the genus is confined to this subfamily; species are known from the western North Atlantic and the Indo-West Pacific.

E-48499

Green, T.H., **Petrology and geochemistry of basaltic rocks from the Balleny Is., Antarctica**, *Australian journal of earth sciences*, Dec. 1992 39(5), p.603-617, 45 refs.

Rock samples obtained from Sabrina and Sturge Islands in the Balleny Group during the 1978 Lewis Expedition are ocean island basanite, verging on hawaiiite. A noteworthy geochemical feature is a consistently low Zr/Nb ratio (about 3.5) compared with a typical value of 5.8 (range 4.5-6.6) for other ocean island alkaline rocks of basanitic to alkaline basaltic composition. Sturge samples are partly cumulative, with conspicuous clinopyroxene and olivine phenocrysts. All rocks are derivative from primary mantle melts, and evidence for fractionation at moderate pressure (probably corresponding to mantle depths of 15-20 km) is provided by the presence of aluminous orthopyroxene, aluminous clinopyroxene, kaersutitic amphibole and olivine with complex minor element zoning patterns. Oxide phases present are varied, from chrome spinel included in olivine and pleonaste included in plagioclase, to microphenocrysts of ilmenite and titanomagnetite. The Balleny volcanism appears to represent typical hot spot activity and may be part of a hot spot trace extending from the Balleny Is. northwards to the Cascade Plateau and eastern Tasmania. There is no convincing evidence that it is related to magmatism

through a 'leaky' transform fault linked with the conspicuous Balleny Fracture Zone.

E-48503

Larter, R.D., Cunningham, A.P., **Depositional pattern and distribution of glacial-interglacial sequences on the Antarctic Peninsula Pacific margin**, *Marine geology*, Jan. 1993 109(3/4), p.203-219, 46 refs.

The outer shelf on the Antarctic Peninsula Pacific margin south of 63.5S is underlain by Pliocene-Pleistocene prograding sequences which have been produced mainly by the action of ice sheets grounded out to the shelf edge at times of glacial maximum. A representative prograding sequence mapped across an extensive network of multi-channel seismic reflection lines has an elongate depocentre on the upper palaeoslope, which is consistent with the grounded ice sheet model. Depth-to-surface maps reveal a broad variation along the margin in the amount of progradation, reflecting differences in sediment supply. The pattern of progradation and the bathymetry of the outer shelf suggest that the main depocentre in the area studied was fed by an ice stream at times of glacial maximum. Seismic lines across the margin farther to the southwest indicate the existence of other depocentres. Several broad depositional lobes have probably coalesced to form the extensive outer shelf. The present continental slope is smooth and steep, and is not cut by major canyons. Deep drilling data indicate that the rise sediments consist mainly of terrigenous turbidite and ice-rafted detritus. A marked upward change in seismic facies on the continental rise indicates a change to a higher energy sedimentary regime and appears to correlate with the start of glacial progradation on the shelf. (Auth. mod.)

E-48524

Turner, J.W., Jr., **Dispersal and provenance of fine-grained sediments and the influence of marine transgression on the Ross Sea continental shelf, Antarctica**, Columbus, Ohio State University, 1992, 260p., University Microfilms order No. AAD92-38291, Ph.D. thesis. Refs. p.228-238.

The Ross Sea continental shelf is unusual due to its great depth, high relief, and lack of fluvial input. Surface currents and storm waves have little impact upon the seafloor, and the influence of tidal currents may also be limited. Previous workers have noted an overabundance of fine-grained sediments on the continental shelf relative to coarser-grained residual glacial marine sediments, which have been winnowed by benthic currents. This study examines the origin of fine-grained terrigenous sediments on the Ross Sea continental in terms of a regressive-transgressive model of shelf sedimentation. Seafloor photography, mean silt diameter, and gross sediment texture are used to evaluate the intensity of benthic circulation. On the basis of these investigations, Ross Sea surface sediments are subdivided into the following facies: scoured slope deposits, relict deposits, palimpsest deposits, modern deposits, and hybrid deposits. The last of these facies is unique to high latitude continental shelves. The distribution of sedimentary facies in the Ross Sea is a result not only of modern sedimentary processes, but also of previous glacial conditions which occurred when grounded ice was present across the continental shelf, possibly during the last glacial maximum. (Auth. mod.)

E-48527

Xiao, X.Y., **Trace element study of formation processes of carbonaceous chondrites and regolith processes on Fayetteville parent body**, West Lafayette, IN, Purdue University, 1992, 177p., University Microfilms order No. AAD92-29210, Ph.D. thesis. Refs. p.166-176.

Labile trace elements are used to establish thermal histories and evolutionary episodes of meteorites. Fourteen trace elements—Ag, Au, Bi, Cd, Co, Cs, Ga, In, Rb, Sb, Se, Te, Tl, and Zn—covering most labile trace elements, were determined by radiochemical neutron acti-

vation analysis, in samples of C1-6 and unique carbonaceous (C) chondrites, mainly from Antarctica and a few non-antarctic specimens, and in samples of dark matrix, and dark and light inclusions of the Fayetteville H chondrite regolith breccia. Trace element contents in antarctic and non-antarctic carbonaceous chondrites are similar: they are essentially unaltered by weathering in Antarctica and by secondary metamorphism. The entire suite of carbonaceous chondrites samples a compositional continuum in which incorporated lesser complements of volatiles, essentially unfractionated from cosmic composition. In Fayetteville regolith breccia, most dark inclusions had similar mean trace element concentrations as matrix but were compositionally more heterogeneous. Two dark inclusions were unique, one having apparently formed from impact-melted soil, the other being a mixture of 90% matrix—10% C2M chondrite. The light inclusion proved compositionally similar to H4-6 chondrite falls except for its higher contents of labile Bi, Cd, In, and Tl. (Auth. mod.)

E-48597

Sugden, D.E., Denton, G.H., Marchant, D.R., **Subglacial meltwater channel systems and ice sheet overriding, Asgard Range, Antarctica**, *Geografiska annaler*, 1991 73A(1), p.109-121, 24 refs.

Various morphological features in the mountain ranges of the Dry Valleys region have been interpreted as reflecting late Tertiary overriding by an expanded East Antarctic Ice Sheet. Such features include large-scale stoss and lee topography, and anastomosing systems of channels and potholes. Alternative explanations for the features have been suggested and throw some doubt on the overriding hypothesis. This paper investigates channels and potholes in part of the Asgard Range in some detail and concludes that they do indeed reflect overriding ice. The channels are subglacial meltwater systems reflecting ice flow across the mountains from southwest to northeast. The channels were probably cut by sudden outbursts of meltwater beneath a local warm-based zone within a predominantly cold-based ice sheet.

E-48598

Clark, R., Wilson, P., **Occurrence and significance of ventifacts in the Falkland Islands, South Atlantic**, *Geografiska annaler. Series A: Physical geography*, 1992 74A(1), p.35-46, 27 refs.

Ventifacts, developed on a variety of lithologies and at a range of scales, are reported for the first time from the Falkland Is. Detailed observations of ventifact locations and site stratigraphies indicate most examples are associated with a major occasion of wind activity following a period of severely cold climate but before restoration of vegetation cover and peat formation. C-14 dates (c. 13.6-11.0 ka B.P.) from basal peats consign ventifact formation to the Late Glacial period. Abundant material susceptible to wind movement was available at that time. The erosion and movement of sand continues at many sites but at none can it be demonstrated that ventifact formation is entirely a recent or contemporary process. The C-14 dates also reveal that climate amelioration following the last cold episode occurred significantly earlier than previously thought. (Auth.)

E-48638

Andersen, D.W., Wharton, R.A., Jr., Squyres, S.W., **Terrigenous clastic sedimentation in antarctic dry valley lakes**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.71-81, 24 refs.

Terrigenous clastic sediment is abundant in many of the lakes of the antarctic dry valleys. Sedimentation patterns are strongly influenced by the ice covers of these lakes, resulting in dispersal of coarse sediment across the lake surfaces, even far from shore. The

resulting deposits are thus very different from the deposits of most lakes in temperate latitudes. In addition, sediment deposition in many lakes is highly localized and is probably controlled by fractures or porous conduits through the ice. The resulting ridges and mounds of pebbly sand may be unique to the ice-covered lake environment. With changes in the conditions of the lakes through time, clastic sediment becomes interstratified with biogenic sediment and evaporites. Changes in the rates of clastic sediment deposition probably result from ice-sediment interactions and from external controls, such as climatic changes; thus the sedimentary deposits in these lakes may provide sensitive local climatic records. (Auth.)

E-48639

Smith, G.I., Friedman, I., **Lithology and paleoclimatic implications of lacustrine deposits around Lake Vanda and Don Juan Pond, Antarctica**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.83-94, 28 refs.

Lake sediments exposed on the sides of Wright Valley, around Lake Vanda and Don Juan Pond, indicate that the lakes underwent a period of expansion relative to their former and present sizes. Carbon 14 ages show that Lake Vanda's expansion occurred 2000 to 3000 years ago. Most of the coarse lacustrine deposits are sands and gravels that are poorly sorted, but have properties that are otherwise characteristic of deposition in lakes. Expansion of these water bodies is inferred to have been a product of a geologically brief episode of warming that produced more inflow by temporarily increasing the volume of meltwater, and raised the snow line and caused the tributary glaciers to retreat to higher elevations. When summer temperatures reverted to their former (cooler) levels, runoff produced by melting of the high-elevation ice and snow was markedly reduced for a period, and Lake Vanda and possibly Don Juan Pond nearly desiccated. Eventually, the glaciers readvanced to their former levels in the zone of summer melting, returning Lake Vanda and Don Juan Pond to their former and present climatic equilibrium level. The readvancing glaciers covered whatever morainal record was deposited during the postulated warming event. (Auth.)

E-48640

Matsumoto, G.I., **Geochemical features of the McMurdo Dry Valleys lakes, Antarctica**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.95-118, Refs. p.114-118.

General characteristics, major ionic components, and minor elements, nutrients, and organic components in lakes and ponds of the McMurdo Dry Valleys are discussed. The lakes and ponds contain various amounts of salts in a variety of compositions. Salinities range from snow meltwater to 13 times seawater. These salts can be explained by the mixing of a common source of atmospheric fallout with various local sources, such as rock weathering, groundwater (including hydrothermal activity), and trapped seawater. The composition of organic components changes in the lakes and ponds, reflecting differences in microbial communities and their activities. As expected, phenolic acids, related to the lignin of vascular plants, are not detected in the lakes. The predominant sterol is frequently 24-ethylcholesterol. Also, significant amounts of long-chain *n*-alkanes and *n*-alkanoic acids are detected in some lake sediments, suggesting that microorganisms are important sources of long-chain *n*-alkanes and *n*-alkanoic acids in natural environments. Vertical distributions of physicochemical properties reveal the zonation of microbial communities in the lakes. Deposited organic matter is degraded quickly by microbial activity in the anoxic lake bottom. (Auth. mod.)

E-48641

McKnight, D.M., **Dissolved organic material in dry valley lakes: a comparison of Lake Fryxell, Lake Hoare and Lake Vanda**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.119-133, Refs. p.132-133.

Lake Fryxell, Lake Hoare, and Lake Vanda were studied to determine relations between source and composition of dissolved organic matter in lakes with different physical, chemical, and biological characteristics. Profiles of dissolved organic matter in the water column, calculations of streamflow contribution of dissolved organic matter over the age of the lakes, inorganic profiles, and dissolved organic material fractionation results are discussed in relation to autochthonous versus allochthonous source. Chemical characteristics of the major dissolved organic carbon fractions (fulvic and hydrophilic acids) are very similar among lakes, and may reflect the overwhelming influence of precursor compounds on the chemistry of microbially derived hydrophilic and fulvic acids. The differences among lakes are explained in terms of the dominant processes in the three dry valley lakes. (Auth.)

E-48642

Lyons, W.B., Mayewski, P.A., **Geochemical evolution of terrestrial waters in the Antarctic: the role of rock-water interactions**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.135-143, Refs. p.142-143.

The geochemistry of the deep groundwater in the dry valleys of southern Victoria Land resembles that of brines observed in continental shield crystalline rocks. This paper reviews the nature of these brines and discusses the possible mechanisms of their formation. It is concluded that rock-water interactions either in the nearby volcanic rocks or in the basement granitic rocks are very important in the generation of these fluids in the dry valleys. (Auth.)

E-48643

Green, W.J., **Metal transport and release processes in Lake Vanda: the role of oxide phases**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.145-163, Refs. p.162-163.

Data are presented on the composition of trapped particles collected over a 1-year period in Lake Vanda, a closed-basin, permanently ice-covered antarctic lake. Sedimentation rates in the lake varied from 120.0 mg/sq cm/yr near the Onyx River to 9.5 mg/sq cm/yr in the deep basin. X ray diffraction data showed that clay-sized particles were largely quartz, feldspar, and amorphous aluminosilicates transported by the river to the lake. In-lake particle production appears to be small, except in the deepest water around 58 m (photosynthetic maximum) and 65 m (elemental sulfur formation). Both water column profiles and particle compositions suggest the important role played by manganese oxide phases in metal transport, scavenging, and, especially, release in the Lake Vanda water column. The relatively long residence times of such metals as Cu, Cd, and Ni in the Lake Vanda system are explained by the low overall sediment deposition flux and the low rate of *in situ* organic carbon production. The study suggests that in the oligotrophic system of Lake Vanda, the removal of metals from oxic waters is controlled largely by inorganic processes. In deep, productive waters just above the anoxic zone, metal transport by organic particles appears to be significant. (Auth. mod.)

E-48684

Yanai, K., ed, NIPR Symposium on Antarctic Meteorites, 17th, Tokyo, Aug. 19-21, 1992, **Proceedings of the NIPR Symposium on Antarctic Meteorites, No.6**, Tokyo, National Institute of Polar Research, 1993, 427p., Refs. passim. For selected papers see E-48685 through E-48709.

This is a collection of papers presented at the 17th Symposium on Antarctic Meteorites held on Aug. 19-21, 1992, in Tokyo. This volume consists of two parts: A and B. The former is assigned to reports of two consortium studies: antarctic lunar meteorites, and antarctic unique meteorites. The latter covers general topics on antarctic meteorites and related subjects. Petrology, mineralogy, chemical studies, isotopic studies, and physical studies on antarctic and non-antarctic meteorites are discussed.

E-48685

Takeda, H., Arai, T., Saiki, K., **Mineralogical studies of lunar meteorite Yamato-793169, a mare basalt**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.3-13, 20 refs.

A preliminary mineralogical study of the lunar meteorites Yamato(Y)-793169 and Asuka(A)-881757, which were apparently derived from a mare region of the moon, has been performed to identify crystallization trends of their pyroxenes. Y-793169 is a crystalline basalt with similar basaltic components to lunar breccias EET87521 and Y-793274, containing strongly zoned Fe-Ca-rich pyroxenes. Their zoning trends in the pyroxene quadrilateral are closest to those found in the basaltic clast in an Apollo 16 breccia. Differentiation trends expressed by $Ti/(Ti+Cr)$ versus $Fe/(Fe+Mg)$ of Y-793169 trend starts at a more Mg-rich composition point than the A-881757 trend. Based on differences in textures and ranges of zoning trends, the pyroxene of A-881757 could represent growth deeper in the lava unit, under conditions more closely approaching equilibrium, than Y-793169, which appears to have formed from a lava flow of similar bulk composition. Although Y-793169 has been described as the VLT basalt, some mesostases contain significant amounts of ilmenite and ulvöspinel, together with fayalite, troilite, chromite and a silica mineral. Mg-rich pyroxenes as found in Y-793274 and EET87521 are not present in Y-793169 and A-881757 basalts. (Auth.)

E-48686

Koeberl, C., Kurat, G., Brandstätter, F., **Gabbroic lunar mare meteorites Asuka-881757 (Asuka-31) and Yamato-793169: geochemical and mineralogical study**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.14-34, Refs. p.32-34.

Asuka-31 (Asuka-881757) is a new type of gabbroic mare basalt which is similar to VLT mare basalts from Apollo 17 and Luna 24. The small lunar meteorite Yamato-793169 was described to have petrologic characteristics that are similar to those of A-881757; this similarity is confirmed here for trace element compositions. Bulk (powder) samples and mineral and rock fragments of A-881757 were studied. The mineralogy and mineral chemistry of the separates from A-881757,111 is that of a coarse-grained gabbroic rock of VLT composition. The texture of the mesostases suggests some metamorphic recrystallization with highly unequilibrated mineral compositions. As for mineral phases, plagioclase, pyroxene, fayalite, Fe-Ni metal, silica, apatite, and some trace minerals were found. In addition, ulvöspinel were found associated with Na-rich plagioclase, fayalite, apatite, ilmenite, SiO₂, Fe-sulfide, and a rare metal (0.3 wt% Ni, 2.0 wt% Co) which has a composition unknown so far from any lunar rocks. The trace element contents found in the mineral separates and

fragments correspond closely to the mineralogical findings. (Auth. mod.)

E-48687

Warren, P.H., Kallemeyn, G.W., **Geochemical investigation of two lunar mare meteorites: Yamato-793169 and Asuka-881757**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.35-57, Refs. p.54-57.

The Yamato-793169 and Asuka-881757 meteorites are remarkably similar to one another, and clearly of lunar origin, but not quite like any previously studied lunar rock. In the Ti-based classification system for mare basalts, Y-793169 and A-881757 are both low-Ti. However, viewed in relation to their extraordinarily low *mg* ratios, their Ti contents are also marginally consistent with kinship to previously-studied VLT (very-low-Ti) mare basalts. The diversity and lack of systematics among lunar mare basalt compositions, reinforced by Y-793169 and A-881757, support the magma ocean cumulate model for genesis of the mare source regions. The relationship between geochemistry and age among mare basalts seems more complex than previously supposed, probably because the compositional stratification that develops in the pile of magma ocean cumulates is too disorderly to conform with any model for depth-time-temperature evolution of the lunar interior. (Auth. mod.)

E-48688

Torigoye, N., Misawa, K., Tatsumoto, M., **Low U/Pb source in the moon: U-Th-Pb systematics of lunar meteorite Yamato-793169**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.58-75, 31 refs.

U-Th-Pb isotopic data were determined on mineral separates of the diabasic lunar meteorite Yamato-793169, in order to define its age and characterize its magma source. Analysis of HBr leaches revealed that the meteorite was heavily contaminated with terrestrial Pb during its residence in antarctic ice. The three most radiogenic residues indicate a Pb-Pb age of 3916 ± 90 Ma. However, this age determination is uncertain because of possible modern terrestrial Pb contamination. The contamination-corrected data and residues of pyroxene and plagioclase separates define U-Pb, Th-Pb, and Pb-Pb ages that are within error of each other. The best estimate for the Pb-Pb age of Yamato-793169 using the corrected data is 3930 ± 240 Ma. Although one cannot define the age of the diabase exactly, calculations indicate that the age is around 3.9 Ga and not 3.3-3.6 Ga, as observed for most LT and VLT mare basalts. (Auth. mod.)

E-48689

Nagao, K., Miura, Y., **Noble gases and Kr-81 terrestrial age of Asuka 881757 lunar meteorite**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.76-87, Refs. p.85-87.

Noble gas compositions of the Asuka-881757 lunar meteorite were determined using 10.2 and 395.3 mg specimens. This meteorite has virtually no solar type noble gases. Small amounts of trapped Ar, Kr and Xe have relative abundances similar to those of atmospheric and planetary noble gases. K-Ar age is 3.75 ± 0.35 Ga, which agrees with the ages by other methods such as U-Th-Pb, Rb-Sr and Ar-Ar. Cosmogenic isotope concentrations are the lowest among the lunar meteorites reported until now. These isotopes were produced in space by 4- π geometry irradiation. The history of A-881757 based on the cosmic-ray produced stable isotopes and Kr-81 is as follows: it had been shielded from the cosmic ray irradiation until it was ejected from the moon 1.35 ± 0.17 Ma, and fell to the earth 0.06 Ma after a moon-earth transit time of 1.29 ± 0.13 Ma. These results require an ejection event for A-881757 in addition to those responsible for the other lunar meteorites. (Auth.)

E-48690

Kaneoka, I., Nagao, K., **Ar-40/Ar-39 analyses of a lunar meteorite (Yamato-86032) and a few LL3 and LL4 chondrites from Antarctica**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.88-99, 18 refs.

Ar-40/Ar-39 analyses were performed for a lunar meteorite (Yamato-86032), two LL3 (Y-790448, Allan Hills-764) and one LL4 (Y-74442) chondrites from Antarctica. The lunar meteorite Y-86032 shows a scattered Ar-40/Ar-39 age spectrum with anomalously high ages in the higher temperature fractions, indicating a shock effect on the analyzed sample. Among the three LL chondrites analyzed, the sample Y-790448 indicates a plateau Ar-40/Ar-39 age of 4521 Ma in the lower temperature fractions (600-800 C). The other two LL chondrites show inverse staircase spectra in the higher temperature fractions. In the LL chondrite group, unequilibrated chondrites seem to show older Ar-40/Ar-39 ages compared with equilibrated ones, which may be related to the differences in the thermal history of each portion of their parent body. (Auth.)

E-48691

Torigoye, N., Yamamoto, K., Misawa, K., Nakamura, N., **Compositions of REE, K, Rb, Sr, Ba, Mg, Ca, Fe, and Sr isotopes in antarctic "unique" meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.100-119, Refs. p.117-119.

The abundances of Mg, Ca, Fe, K, Rb, Sr, Ba, and REE in 5 antarctic "unique" meteorites, acapulcoite-lodranite type Yamato(Y)-74063, Y-74357, Y-8002 and Allan Hills(ALH)-78230, and winonaite-type, Y-75300 were determined by isotope dilution mass spectrometry. The Sr isotopic compositions of Y-74063, Y-75300, Y-8002, and ALH-78230 were also measured to investigate the whole-rock Rb-Sr isotopic systematics. Using the mineral liquid partition coefficients of trace elements, the petrogenic model calculations were performed. The results suggest the origin of these "unique" meteorites. Y-74063 and ALH-78230 could have been formed through a small degree of partial melting (less than a few%) from a chondritic starting material. Y-74357 could be formed by a larger degree (12%) of partial melting. On the other hand, the V-shaped REE pattern of the third group (Y-75300 and Y-8002) could not be explained by a simple partial melting process. The V-shaped REE pattern may be explained only by assuming a solid state equilibrium within a reservoir with chondritic composition. It is suggested that Y-75300 and Y-8002 might be derived from parental materials depleted in phosphate and clinopyroxene. (Auth. mod.)

E-48692

Takaoka, N., Nagao, K., Miura, Y., **Noble gases in the unique meteorites Yamato-74063 and -74357**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.120-134, 22 refs.

In Yamato-74063, the correlation in a three-isotope plot of Ne indicates Ne-A as the trapped component and a cosmogenic Ne-22/Ne-21 ratio as high as 1.31. Considerable amounts of trapped gases are present in both metal and silicate separates. Trapped Ar-36/Xe-132 is different for metal and silicate (72 and 17, respectively). The isotopic compositions of Kr and Xe are homogeneous and identical within errors for almost all temperature fractions of both separates. There is a correlation between Ar-36/Xe-132 and Kr-84/Xe-132 for Y-74063, other unique meteorites and planetary Q-gas. The origin of trapped gas with low Ar/Xe is discussed. Under laser ablation, most mineral grains released large amounts of trapped gases, suggesting that the trapped gases are not contained in specific carrier phases but in many major minerals. The Y-74357 meteorite contains very little trapped gases. The cosmogenic Ne-22/Ne-21 ratio of 1.076 in-

icates that the stone was irradiated at an intermediate depth of a meteoroid. However, cosmogenic He-3/Ne-21 and Ar-38/Ne-21 are significantly lower than the ratios of production rates calculated for chondritic target chemistry, indicating that the stone is enriched in Mg and depleted in Ca. Correction for target chemistry (Mg) gives a tentative cosmic-ray exposure age of 10.1 Ma. (Auth.)

E-48693

Yanai, K., Kojima, H., Naraoka, H., **Asuka-87 and Asuka-88 collections of antarctic meteorites: search, discoveries, initial processing, and preliminary identification and classification**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.137-147, 12 refs.

Over 2,400 pieces of meteorites were collected by the Asuka wintering party of JARE-29 (1987-89) on the bare icefields around the Sör Rondane Mountains. According to the initial processing, the Asuka-87 meteorites comprise one iron, one stony-iron, 9 achondrites, 3 carbonaceous chondrites and over 300 ordinary chondrites, the total weight being 120 kg. The largest specimen in the Asuka-87 collections is an LL-group chondrite of about 46 kg. The Asuka-88 meteorites comprise 7 irons, 5 stony-irons, over 50 achondrites, 31 carbonaceous chondrites and over 2,000 ordinary chondrites. The total weight is about 400 kg. Two specimens in the Asuka-88 collection were tentatively identified as a very coarse-grained and unbrecciated gabbroic meteorite and an olivine-fassaite-plagioclase achondrite with crystalline texture. (Auth. mod.)

E-48694

Yanai, K., **Asuka-87 and Asuka-88 collections of antarctic meteorites: preliminary examination with brief descriptions of some typical and unique-unusual specimens**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.148-170, 19 refs.

Preliminary examinations were carried out of over 2,400 pieces of the new Asuka meteorites. The Asuka-87 meteorite collection consists of one iron, one stony-iron, 9 achondrites, 3 carbonaceous meteorites and over 300 chondritic specimens. The Asuka-88 meteorite collection comprises 7 irons, 5 stony-irons, over 50 achondrites, 31 carbonaceous meteorites and over 2,000 chondritic specimens. With a polarizing microscope and electron microprobe, one mesosiderite, 2 ureilites, 2 diogenites (possibly paired) and 2 eucrites were identified in the Asuka-87 collection. In the Asuka-88 collection, one unbrecciated gabbro and one olivine-fassaite basalt were examined. These unusual specimens were determined to be a lunar mare gabbro and an angrite-type achondrite. Diogenites, ureilites, and one fine-grained, one coarse-grained and one porphyritic eucrite were also newly identified in the Asuka-88 collection, together with a pallasite, a mesosiderite and CM, CV, CO chondrites. (Auth.)

E-48695

Nakamura, T., Tomeoka, K., Takeda, H., **Mineralogy and petrology of the CK chondrites Yamato-82104, Yamato-693 and a Carlisle-Lakes-type chondrite Yamato-82002**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.171-185, 27 refs.

The mineralogy and petrology of 3 metamorphosed chondrites, Yamato(Y)-82104, Y-693, and Y-82002, which were previously classified as C5, C4 and C5, respectively, were studied. The results indicate that Y-82104 and Y-693 should be included with the CK carbonaceous chondrites. Y-82104 and Y-693 are remarkably similar in mineralogy and texture (e.g., virtually identical compositions of olivines), thus they are probably paired. The compositional homogeneity of olivine and pyroxene and degree of recrystallization of olivine

and plagioclase are consistent with Y-82104 and Y-693 being petrologic type 5. Y-82002 differs from most CK chondrites in mineralogy and petrology, but is similar to Carlisle Lakes-type chondrites which were recently proposed to be a new grouplet of chondrites. It is believed that Y-82002 is a member of this grouplet. Y-82002 was previously classified as petrologic type 5, but the relatively inhomogeneous compositions of olivine (e.g, Fa 35.1 \pm 5.1 for chondrules) and low degree of recrystallization of olivine and plagioclase suggest that Y-82002 should be classified as petrologic type 3.8-3.9. (Auth.)

E-48696

Kimura, M., **Mineralogy of antarctic aubrites, Yamato-793592 and Allan Hills-78113: comparison with non-antarctic aubrites and E-chondrites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.186-203, 37 refs.

Two antarctic aubrites, Yamato(Y)-793592 and Allan Hills(ALH)-78113, were mineralogically studied, for comparison with minerals in non-antarctic aubrites and enstatite chondrites. The antarctic aubrites are breccias consisting of coarse-grained enstatite fragments and fine-grained matrix. ALH-78113 has 200-300 micron dark clasts that are fine-grained aggregates of silicate and opaque minerals. FeO-rich pyroxene (up to Fs21) occurs in the dark clasts. One dark clast has K-feldspar. These dark clasts seem to be exotic inclusions with distinct mineralogy. Daubreelite in the two antarctic and non-antarctic aubrites is lower in Zn than those in EH3-5 chondrites. This reflects the depletion of volatile elements in aubrites. Hydrated Na-Cr-sulfides were also found. Djerfisherite is a common accessory mineral in aubrites. It is characterized by low contents of Cu and Na, and high content of Ni, in comparison to djerfisherite in EH3-5 chondrites. Y-793592 has many roedderite grains. The occurrences of roedderite, Na-Cr sulfides and djerfisherite in aubrites suggest that Al₂O₃ relative to alkali elements may have been fractionated during nebular or magmatic processes. (Auth.)

E-48697

Noguchi, T., **Petrology and mineralogy of CK chondrites: implications for the metamorphism of the CK chondrite parent body**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.204-233, Refs. p.231-233.

The petrology and mineralogy of four CK chondrites, Karoonda (CK4), Maralinga (CK4), Yamato(Y)-693 (CK4), and Elephant Moraine (EET)87507 (CK5) were investigated in detail to estimate the origin of their quite heterogeneous plagioclases and the metamorphic history of the CK chondrite parent body. EPMA analyses and SEM observations revealed that plagioclases in chondrules, CAIs, and matrices in CK chondrites have different compositional variations and that plagioclases in matrices display distinct reverse zoning in regard to An content. The occurrences and compositions of pyroxenes are different among less-recrystallized CK chondrites and recrystallized CK chondrites. Low-Ca pyroxenes in recrystallized matrices are enclosed in matrix plagioclases and different in CaO and Al₂O₃ contents from those in chondrules. Compositions of low-Ca pyroxenes in matrix plagioclases suggest that they include Fe³⁺. They were probably formed during metamorphism under high oxygen fugacities. Highly oxidized metamorphic conditions are supported by the existence of Fe³⁺ in spinels and high NiO contents in olivines. Olivine-spinel geothermometry and pyroxene compositions suggest that Maralinga, Y-693, EET87507, and some fragments in Karoonda were heated to temperatures as high as those of type 5 to 6 ordinary chondrites (750-850 °C). Slow cooling below 400 °C of these meteorites was estimated by sulfide mineral assemblages. Because Maralinga has many different properties from other CK chondrites investigated, it is considered an anomalous CK chondrite. (Auth. mod.)

E-48698

Hiroi, T., Bell, J.F., Takeda, H., Pieters, C.M., **Spectral comparison between olivine-rich asteroids and pallasites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.234-245, 19 refs.

Reflectance spectra of two pallasites were measured and compared with four reflectance spectra of olivine-rich asteroids. Bidirectional reflectance spectra (0.3-2.6 microns) were measured at several different points on chips of Yamato(Y)-8471 and Imilac pallasite. A metal-rich part of Y-8451 showed a reflectance spectrum very similar to 113 Amalthea. Other olivine-rich asteroids could not be fit well even by combining all the measured reflectance spectra of those two pallasites. Some kind of regolith process seems to be important in producing those reflectance spectra. Y-8451 is unusual as a pallasite. Its olivine grains are much smaller than usual pallasites, the Fa value is the lowest, and both orthopyroxene and inverted protoenstatite are present. Their Fe/(Fe+Mg) ratios correspond to a formation temperature of 1135 C. Y-8451 is similar to metal-rich primitive achondrites such as Y-791058, which is therefore also examined in this study. 113 Amalthea is another example of the S asteroids whose reflectance spectra can be approximated with a stony-iron model. (Auth.)

E-48699

Snyder, G.A., Taylor, L.A., **Constraints on the genesis and evolution of the Moon's magma ocean and derivative cumulate sources as supported by lunar meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.246-267, Refs. p.264-267.

It is generally considered that the outer portion of the Moon was molten in its early history. Antarctic lunar meteorites support this supposition, indicating the presence of a global plagioclase-rich crust derived from magma ocean flotation cumulates. Lunar meteorites also contain a significant very low-Ti (VLT) mare basalt component which was likely generated by the melting of a cumulate mantle formed in an early moon-wide magma ocean. Early in the evolution of the mantle, when the lunar magma ocean (LMO) still was largely liquid, it is likely that vigorous convection was an important factor in crystallization. Such convection would allow crystals to remain suspended and in equilibrium with the LMO liquid for relatively long periods of time. This extended period of equilibrium crystallization would then have been followed by fractional crystallization once plagioclase became a liquidus phase and began to float to form the lunar highlands crust. (Auth. mod.)

E-48700

Mittlefehldt, D.W., Lindstrom, M.M., **Geochemistry and petrology of a suite of ten Yamato HED meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.268-292, Refs. p.290-292.

Petrological characterization and geochemical studies were performed by instrumental neutron activation analysis of a suite of 10 Yamato HED samples: Y-74013, Y-74097 and Y-74136 (Type A diogenites); Y-75032 and Y-791199 (Type B diogenites); Y-791195 (cumulate eucrite); Y-793164 and Y-82066 (eucrites); and Y-791192 and Y-82049 (polymict eucrites). The Type A diogenites are essentially identical in composition except for slight differences in Cr, Co, Se and La, which are likely due to inhomogeneous distribution of the minor phases chromite, metal and troilite, and trapped interstitial melt, respectively. The petrology and REE patterns for Type B diogenites show that they are not adcumulate rocks, but rather contain substantial, perhaps 15%, interstitial liquid trapped in the samples. (Auth. mod.)

E-48701

Kerridge, J.F., **Origins of organic matter in meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.293-303, Refs. p.301-303.

Several abiotic chemical processes acting in several different astrophysical and cosmogonic environments have contributed to the population of organic compounds preserved in carbonaceous meteorites. Those environments include interstellar molecular clouds and the near-surface regions of asteroid-sized objects in the early solar system. There is little evidence for synthesis of organic compounds from the primordial solar-nebular gas. Data from various antarctic meteorites are referenced in the paper. (Auth.)

E-48702

Flynn, G.J., Sutton, S.R., Klöck, W., **Compositions and mineralogies of unmelted polar micrometeorites: similarities and differences with IDPs and meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.304-324, Refs. p.322-324.

Polar micrometeorites have major element abundances consistent with chondritic meteorites and IDPs, except that Ni and S are strongly depleted. Synchrotron X-Ray Fluorescence trace element abundance measurements of 12 antarctic and 4 Greenland micrometeorites from 50 to 150 microns show enrichments by 2 to 5 times over CI abundances for Cu, Zn, and Ga; however Ni, Ge, and Se are depleted relative to Ci. This abundance pattern differs significantly from both chondritic meteorites and IDPs, including IDPs heated on atmospheric entry. There is no correlation of element enrichment or depletion with nebula condensation temperature. Olivine, pyroxene, magnetite, chromite, spinel, and glass, which commonly occur in IDPs and meteorites, were identified in these particles by analytical transmission electron microscopy. However, layer-lattice silicates, also common in IDPs, CI and CM carbonaceous meteorites, were not identified in any of these polar micrometeorites. Textural relationships and mineral compositions suggest these polar micrometeorites were strongly heated during atmospheric entry. Their chemical compositions and mineralogies show similarities to both the IDPs and the chondritic meteorites, but they are not identical to either type of material. (Auth. mod.)

E-48703

Miura, Y., Sugiura, N., **Nitrogen isotopic compositions in three antarctic and two non-antarctic eucrites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.338-356, 25 refs.

Nitrogen isotopic compositions were determined by the stepped combustion method for three antarctic eucrites (Allan Hills-76005, Yamato(Y)-792510 and -82066) and two non-antarctic eucrites (Juvinas and Camel Donga). The abundances of indigenous nitrogen in these eucrites are from 0.05 to 1.3 ppm, much lower than that in ordinary chondrites. The lower abundance of nitrogen for eucrites is due to thermal events on the parent body. Isotopic ratios of the trapped nitrogen are also considered. The contribution of terrestrial nitrogen ($\delta N-15$ from 0 per mill to +20 per mill) and cosmogenic nitrogen ($\delta N-15 > +100$ per mill) is significant in the case of eucrites at low temperature (<600 C) and high temperature (>1000 C) fractions, respectively. Hence, nitrogen released at medium temperature fractions is considered. The observed minimum $\delta N-15$ values released in medium temperature fractions of Y-792510 and Camel Donga are -54 per mill and -18 per mill, respectively. The low $\delta N-15$ values cannot be explained by contribution of the terrestrial and cosmogenic components. This is strong evidence for existence of trapped components in eucrites which have N-15/N-14 ratios dif-

ferent from the atmospheric value. Since there may be some contribution of terrestrial or cosmogenic nitrogen even at medium temperature fractions, the minimum values observed in the present work should be considered as upper limits for the trapped components. (Auth.)

E-48704

Fujimaki, H., **Rb-Sr age of an impact event recorded in Yamato-791088 H chondrite**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.364-373, 18 refs.

The age of the impact event is recorded in Yamato(Y)-791088, a high-iron type chondrite, and has been dated using the Rb-Sr chronometer. A brief mineralogical characterization was made of the chondrite as well. The obtained impact age is 1024 ± 47 Ma. When Y-791088 recorded the impact event, it might not have been on the surface of the parent body, but rather deep below. Therefore, some sulfide was not vaporized and Rb was not lost during the impact. Metal phases were once homogenized, and plessite, consisting of two phases, is very scarce. After the impact, the parental body could not have lasted long before separating into pieces. (Auth.)

E-48705

Jull, A.J.T., **AMS C-14 ages of Yamato achondritic meteorites**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.374-380, 19 refs.

Terrestrial C-14 ages of some Yamato achondrites and other meteorites have been determined by accelerator mass spectrometry (AMS). Samples of meteorites previously studied for C-14 are reported, as are new measurements on Yamato achondrites. Results on a number of meteorites from the Yamato-79 series show longer terrestrial ages than expected for this site, where young ages predominate. A new C-14 age on Y-74037 confirms the younger age for this diogenite similar to Y-74097, whereas Y-74010 is older (15 kyr). These data suggest there may have been more than one diogenite fall in the Yamato-74 group. (Auth.)

E-48706

Cresswell, R.G., Miura, Y., Beukens, R.P., Rucklidge, J.C., **C-14 terrestrial ages of nine antarctic meteorites using CO and CO₂ temperature extractions**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.381-390, 17 refs.

A suite of Yamato and Transantarctic Mountains meteorites have been analyzed for their C-14 content to give an estimate of their terrestrial age. Further information on the samples' terrestrial history may be obtained from analysis of separate carbon species evolved at different temperatures. The authors report on data obtained from CO and CO₂ separations from a low temperature (500 to 900 C) and high temperature (1600 C) fraction from each sample. Three Allan Hills meteorites, ALH-77232 (H4), ALH-78112 (L6) and ALH-78130 (L6), give terrestrial ages $> 29,000$ years, and probably represent limit ages due to *in situ* production. Three other Transantarctic meteorites, BTN-78002 (L6), MET-78028 (L6) and RKP-78002 (H4), give finite C-14 ages between 15,000 and 27,000 years. Three Yamato meteorites, Y-8011 (L6), Y-81132 (H5) and Y-82095 (L3), give ages between 16,000 and 22,000 years. The low temperature components indicate that recent weathering and atmospheric exchange have taken place for at least four (and possibly six) of the meteorites; ALH-78112, ALH-78130 and Y-81132 have low temperature activities that suggest an earlier exposure and weathering. (Auth.)

E-48707

Funaki, M., **Temperature dependence of coercivity for chondrites: Allende, Allan Hills-769 and Nuevo Mercurio**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.391-400, 9 refs.

The temperature dependence of the hysteresis parameters (saturation magnetization J_s , saturation remanent magnetization $J_{(sub)}R$ (SIRM), coercive force H_c , remanent coercive force $H_{(sub)}RC$ and initial susceptibility χ_i) was examined from 30 C to 750 C for Allende (CV3), ALH-769 (L6) and Nuevo Mercurio (H5) chondrites. The NRM of these chondrites were thermally demagnetized for determination of the NRM blocking ($T_{(sub)}B$) temperature. The hysteresis parameters were compared with the $T_{(sub)}B$ in order to identify which parameter is the most sensitive to the high coercivity grains. The J_s -T and χ_i -T curves showed almost the same transition temperature. The temperature dependency of the $J_{(sub)}R$, H_c and $H_{(sub)}RC$ is useful for the determination of the high coercivity grains which carry the stable NRM. The reliable NRMs are carried by tetraetaenite in ALH-769 and Nuevo Mercurio, although their main magnetic mineral is kamacite. (Auth. mod.)

E-48708

Pesonen, L.J., Terho, M., Kukkonen, I.T., **Physical properties of 368 meteorites: implications for meteorite magnetism and planetary geophysics**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.401-416, 30 refs.

Petrophysical studies (susceptibility, intensity of natural remanent magnetization (NRM) and dry bulk density) of 368 meteorites are reviewed together with magnetic hysteresis data for 50 achondrites and chondrites. The relationships between dry bulk density, metallic FeNi-content and porosity is discussed in the case of L-chondrites. With the petrophysical classification scheme, the meteorite class and the petrologic group of a sample can be determined in most cases, providing a rapid means for determining the preliminary classification of a new sample. In addition, the petrophysical database provides a direct source of basic physical properties of the small bodies in the solar system. Paleointensity determinations with Thellier technique is presented for 16 meteorites representing different chondrite groups. The results yield high paleofield values. (Auth. mod.)

E-48709

Yamanaka, C., Toyoda, S., Ikeya, M., **ESR applications to meteorite samples**, NIPR Symposium on Antarctic Meteorites, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.417-422, 13 refs.

Electron spin resonance (ESR) measurements were performed on several antarctic meteorites. Preliminary results demonstrate some significant features. After the magnetic separation of powdered samples, some ESR measurements gave ferromagnetic resonance-type spectra similar to lunar soils. ESR spectra, presumably associated with radiation-induced defects, were observed in Allan Hills-765 and the CAI portion of the Allende meteorite. (Auth.)

E-48710

Webb, P.N., Harwood, D.M., **Pliocene fossil *Nothofagus* (southern beech) from Antarctica: phytogeography, dispersal strategies, and survival in high latitude glacial-deglacial environments**, Forest development in cold climates. Edited by J. Alden, J.L. Mastrantonio, and S. Ödum, New York, Plenum Press, 1993, p.135-165, Refs. p.158-165.

A recently discovered vegetational biome in the Pliocene Sirius Group of the Dominion Range, Transantarctic Mountains is dis-

cussed. The flora is dominated by the southern beech tree genus *Nothofagus*. The geological occurrence, phytogeographic implications, dispersal, survival, climatic significance, and eventual demise of this flora are discussed, as are recent experiments in which species of *Nothofagus* have been transplanted from South American and Australasian forests to a variety of Northern Hemisphere alpine and arctic post-glacial environments. The ability of *Nothofagus* to survive hostile glacial-deglacial conditions at very high southern latitudes for almost the entire Cenozoic Era (66 million years) is documented. (Auth.)

E-48721

Buick, I.S., Harley, S.L., Cartwright, I.C., **Granulite facies metasomatism: zoned calc-silicate boudins from the Rauer Group, East Antarctica**, *Contributions to mineralogy and petrology*, 1993 13(4), p.557-571, 46 refs.

Calc-silicate boudins from the Rauer Group, East Antarctica, were metamorphosed under granulite facies conditions during late Proterozoic (ca. 1,000 Ma) M3 metamorphism. Boudin cores contain low to moderate aCO₂ assemblages including wollastonite, grossular-andradite (grandite) garnet, clinopyroxene, scapolite, plagioclase, quartz, and calcite. Petrological and stable isotopic evidence suggests that these core assemblages resulted from pre-peak M3 infiltration of water-rich fluids; there is no evidence for a pervasive fluid phase under peak M3 conditions. The boudins are separated from the surrounding Fe-rich pelites and semi-pelites by a series of concentric, high-variance reaction zones developed under peak M3 conditions. Variations in mineral assemblage, mineral composition and whole rock composition across these zones suggest that they formed by diffusional mass-transfer, controlled principally by a chemical potential gradient in Ca across the original calc-silicate-paragneiss lithological boundary. As a consequence of the near-complete decarbonation of the calc-silicates before the M3 peak, development of the diffusion-controlled reaction zones did not liberate significant CO₂ during granulite facies metamorphism. Similar calcite-poor, low aCO₂ calc-silicate horizons in other granulite facies terrains are unlikely to have been important local fluid sources during deep crustal metamorphism. (Auth.)

E-48726

Grunow, A.M., **Creation and destruction of the Weddell Sea floor in the Jurassic**, *Geology*, July 1993 21(7), p.647-650, 38 refs.

New paleomagnetic data indicate clockwise rotation of the Antarctic Peninsula relative to East Antarctica between 175 and 155 Ma that would have created as much as 1000 km of pre-anomaly M25 ocean floor in the Weddell Sea basin. The paleomagnetic data also suggest that between 155 and 130 Ma, the Antarctic Peninsula rotated counterclockwise relative to East Antarctica, rotation that, along with the southward motion of East Antarctica, would have caused subduction of the newly created Weddell Sea ocean floor beneath the southern Antarctic Peninsula. East-vergent folding and thrusting of Jurassic back-arc basin rocks along the southeastern Antarctic Peninsula, known as the Palmer Land event, probably resulted from deformation along this newly created convergent margin. The presence of Jurassic Weddell Sea floor would have isolated eastern Gondwana from the Antarctic Peninsula and western Gondwana, encouraging increased marine faunal connections between the Pacific and Weddell Sea-Mozambique-Somali ocean basins during the 175 to 130 Ma interval. After 130 Ma, the Antarctic Peninsula would have been connected to East Antarctica via the other West Antarctic terranes, thereby facilitating land migrations between eastern and western Gondwana. (Auth. mod.)

E-48733

Fitzsimons, S.J., Domack, E.W., **Evidence for Early Holocene deglaciation of the Vestfold Hills, East Antarctica**, *Polar record*, July 1993 29(170), p.237-240, 10 refs.

The Vestfold Hills area is the third largest ice-free area in Antarctica, after the Dry Valleys area of south Victoria Land and the Bunger Hills of Wilkes Land, and is therefore an important location for finding terrestrial evidence of deglaciation. This report provides new evidence on the timing of deglaciation from the Vestfold Hills, and compares the new evidence with the present model of deglaciation of the area; with the preliminary results from Offshore Drilling Project (ODP) Hole 740A in Prydz Bay; and with evidence of deglaciation from the Ross Embayment and the Antarctic Peninsula.

E-48765

Harvey, R.P., Maurette, M., **Origin and significance of cosmic dust from the Walcott Névé, Antarctica**, *Lunar and Planetary Science. Proceedings*. Edited by G. Ryder et al. Vol.21, Houston, TX, Lunar and Planetary Institute, 1991, p.569-578, 30 refs.

DLC QB592.A64a

Several sediment samples returned from locations around the Walcott Névé area of Antarctica reveal a high concentration of large chondritic ablation spherules, averaging roughly 20 spherules per gram of bulk sediment. The origin of these concentrations of extraterrestrial debris appears to be similar to that of antarctic meteorites; micrometeorites ablating out of blue ice are transported downwind and downslope by strong katabatic winds to the nearest aeolian sediment trap. In the Walcott Névé, these traps are the crests of moraines, weathering debris around boulders, and rough, exposed areas of snow. The Walcott Névé sediments compare favorably with other terrestrial sources of cosmic dust. Most of the spherules are essentially unweathered; however, a great range in weathering is also observed, which may be related to the terrestrial age of the specimens. Only a small number of "unmelted" micrometeorites have been found, possibly due to camouflaging by local terrestrial debris. (Auth. mod.)

E-48766

Allen, C.C., Conca, J.L., **Weathering of basaltic rocks under cold arid conditions: Antarctica and Mars**, *Lunar and Planetary Science. Proceedings*. Edited by G. Ryder et al. Vol.21, Houston, TX, Lunar and Planetary Institute, 1991, p.711-717, 30 refs.

DLC QB592.A64a

Ubiquitous etch pits occur in cobbles of nonvesicular dolerite (basalt) from many ice-free areas of Victoria Land. The pits appear to be formed by dissolution of the rock by rare snow meltwater during the austral summer. Wind erosion removes weathered material from the pits. A model for rock pitting on Mars analogous to that described above for antarctic dolerites is proposed. Water frost or snow deposited on rock surfaces during the winter, as observed at the Viking 2 lander site, occasionally melts, wetting the rocks for short periods of time. During these brief wetting episodes chemical weathering takes place in an extremely thin near-surface zone. Pit formation is initiated at sites of greatest weathering activity. Subsequent wind erosion scours the pits, removing the salts and clays more efficiently than the illite-rich coatings. The results are Fe-rich aeolian fines with lower Al and K contents than their source rocks. (Auth. mod.)

E-48768

Li, S.K., **Geomorphical features at Stornes Peninsula, Larsemann Hills, East Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.16-23, In Chinese with English summary. 4 refs.

The main geomorphic agents at Larsemann Hills were from ice and snow; the geomorphic development after deglaciation occurred in

two stages. The current geomorphic features of Stornes Peninsula are rugged landform, numerous lakes and depressions, clear appearance of tectonic forms, and a wide-spreading periglacial landform. The geomorphic development presents primitive and integrative characters. (Auth.)

E-48769

Wang, X.L., **Geochemical characteristics and divisions of the sediments from the Great Wall Bay, Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.24-30, In Chinese with English summary. 10 refs.

The geochemical characteristics of major elements and the REE occurring in sediments from Great Wall Bay and the volcanic rock of Fildes Peninsula are discussed, including sediment source and the character of the mother rock. Based on environmental factors, the bay is divided into three provinces: erosion and oxidation (coastal province); low energy and reduction (in Great Wall Bay); and slight oxidation (mouth of Great Wall Bay). (Auth. mod.)

E-48790

Cassidy, D.S., **Antarctic Marine Geology Research Facility and Core Library, 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.317-318, 4 refs.

A summary of work accomplished during the 1990-1991 project year (June 1, 1990 to May 31, 1991) by staff of the National Science Foundation's Antarctic Marine Geology Research Facility and Core Library at the Florida State University covers the following activities: the distribution of samples from the collections, the receipt of new specimens, sediment description work, and miscellanea.

E-48794

Carrion, P., **Tomographic inversion of the seismic reflection arrivals acquired at the Ross Sea (Antarctica)**, European Conference on Underwater Acoustics, Luxembourg, Sep. 14-18, 1992. Proceedings. Edited by M. Weydert, London, Elsevier Science Publishers, 1992, p.547-553, 3 refs.

DLC QC242.E87

A seismic section, acquired in the offshore region of the Ross Sea, demonstrates an anomalous elliptic shape inclusion. Gravity and magnetic survey in this area, along with seismic data analysis, yield an opportunity for refined geological study of this region of Antarctica. In order to proceed with analysis of the stacked or prestack seismic sections, knowledge of seismic velocity is required. Different velocity determination methods are available, but this study shows that these methods may lead to different results. In order to test the viability of these methods when applied to complex regions of Antarctica, prestack traveltimes tomography may be implemented with high lateral resolution, which recovers the location of reflection interfaces that can be subsequently verified. (Auth. mod.)

E-48800

Tada, T., Shimazaki, K., Tsuboi, S., **Analysis of short-period P waves from the 1989 Macquarie Ridge earthquake using a broadband array in Japan**, *Geophysical research letters*, Feb. 19, 1993 20(4), p.269-272, 8 refs.

A simple method of array analysis has been developed enabling one to identify apparent radiation centers of teleseismic waves. Applying this method to short-period P waveforms from the 1989 Macquarie Ridge earthquake recorded at 7 stations of the Pre-POSEIDON network in Japan, the authors obtained a pattern of apparent radiation center migration that is more compatible with a bilaterally propagating source model than with a unilateral one. (Auth. mod.)

E-48805

Kimura, M., El Goresy, A., Palme, H., Zinner, E., **Ca-,Al-rich inclusions in the unique chondrite ALH85085: petrology, chemistry, and isotopic compositions**, *Geochimica et cosmochimica acta*, May 1993 57(10), p.2329-2359, 77 refs.

The unique chondrite ALH85085 contains Ca-,Al-rich inclusions (CAIs) that differ from CAIs found in other types of meteorites. The ALH85085 inclusions are smaller (5-80 microns) and more refractory than their counterparts in carbonaceous chondrites. A comprehensive study was made of these inclusions, numbering 88 altogether, in the categories of petrography, mineralogy, chemical composition, isotope analyses, and trace elements. In addition, oxygen-isotopic compositions were determined in minerals from a single inclusion (CAI 125). The ALH85085 inclusions are fractionated in their refractory element abundances. Most of them have very high Al/Ca and Ti/Ca ratios; four CAIs have volatility fractionated (refractory-depleted) Group II-related trace element patterns, one a Group III pattern with a slightly ultrarefractory trace element signature, and one a rather flat pattern with depleted Eu. There is no correlation among mineralogy, major element chemistry, and trace element abundances. It is further shown that the high-temperature geochemical behavior of ultrarefractory trace elements is decoupled from that of the major elements Ca and Ti (Ti is correlated with the relatively volatile elements Nb and Yb), implying that perovskite is of only minor importance as a carrier of ultrarefractories. ALH85085 inclusions with refractory-depleted trace element abundances and no Mg-26 excesses could be the complement to platy hibonites (PLACs) with Group III trace element patterns from the Murchison meteorite. (Auth. mod.)

E-48806

Brearley, A.J., **Matrix and fine-grained rims in the unequilibrated CO3 chondrite, ALHA77307: origins and evidence for diverse, primitive nebular dust components**, *Geochimica et cosmochimica acta*, Apr. 1993 57(7), p.1521-1550, 82 refs.

Mineralogically, both the matrix and rims in ALHA77307 are extremely diverse and consist of a highly unequilibrated assemblage of Si- and Fe-rich amorphous material, olivine, pyroxene, Fe,Ni metal, magnetite, pentlandite, pyrrhotite, anhydrite, and mixed layer phyllosilicate phases. Several distinct components can be recognized within the matrix and rims based on their textural and compositional characteristics, which appear to represent basic fine-grained units of nebular dust. The microstructures of these different components show that they have experienced significantly different thermal histories. Unlike the ordinary chondrites, an origin for any significant component of the matrix or rims in ALHA77307 from chondrules is improbable, based on compositional and microstructural evidence. The matrix and rim components in ALHA77307 were formed by disequilibrium condensation processes as fine-grained amorphous dust that is represented by the abundant amorphous component in the matrix. Such condensation could have occurred under a variety of conditions, at different times and locations within the solar nebula, or possibly earlier in a circumstellar environment. Subsequent thermal processing of this primitive condensate material, in a variety of environments in the nebula, resulted in partial or complete recrystallization of the fine-grained dust. The intimate association of fine-grained components with disparate compositions and thermal histories shows that mixing of fine-grained dust within the nebula must have been extremely thorough. (Auth.)

E-48812

Pankhurst, R.J., Millar, I.L., Grunow, A.M., Storey, B.C., **Pre-Cenozoic magmatic history of the Thurston Island crustal block, West Antarctica**, *Journal of geophysical research*, July 10, 1993 98(B7), p.11,835-11,849, Refs. p.11,848-11,849.

New Rb-Sr and K-Ar geochronological data are presented for the majority of known pre-Cenozoic outcrops in Thurston I., the Jones Mountains, and the western Eights Coast, which collectively represent the basement geology of the Thurston I. crustal block of West Antarctica. Almost all are of calc-alkaline igneous or metaigneous rocks, and indicate long-standing proximity to a magmatic arc. The observable history began with Late Carboniferous (309 \pm 5 Ma) emplacement of mantle-derived orthogneiss precursors in eastern Thurston I. Nd model ages from these and later igneous rocks suggest that the underlying crust is no older than about 1,200-1,400 Ma throughout the area. A variety of cumulate gabbros was emplaced soon after gneiss formation, followed by crust-contaminated diorites that have Triassic mineral cooling dates of 240-220 Ma. In the nearby Jones Mountains, the oldest exposed rock is a muscovite-bearing granite with an Early Jurassic age of 198 Ma. This belongs to a suite of such granites known throughout the Antarctic Peninsula and related to earliest rifting of the Gondwana supercontinent. The subsequent evolution of the Thurston I. area was dominated by I-type magmatism, apparently in two major episodes at 152-142 Ma (Late Jurassic granites) and 125-110 Ma (Early Cretaceous bimodal suite). (Auth. mod.)

E-48816

Harris, C., Grantham, G.H., **Geology and petrogenesis of the Straumsvola nepheline syenite complex, Dronning Maud Land, Antarctica**, *Geological magazine*, July 1993 130(4), p.513-532, Refs. p.531-532.

The 170 Ma Straumsvola nepheline syenite complex in western Queen Maud Land is located on the eastern edge of the Penck-Jutul Trough, a major tectonic feature which may be a Palaeozoic-Mesozoic rift system. The 5 km diameter pluton consists entirely of nepheline syenite and can be divided into two volumetrically important units: a relatively structureless outer zone which is overlain by a layered zone. The latter exhibits continuous rhythmic alternations of layers containing different proportions of alkali feldspar to amphibole + Na-rich pyroxene + biotite + nepheline throughout its 350 m thickness. The mafic zone is a volumetrically minor unit which unconformably overlies the layered zone and consists almost entirely of mafic minerals and nepheline. The layered zone shows no systematic stratigraphic variation in major or trace composition or mineral chemistry, which is interpreted as being due to a combination of migration of intercumulus liquid and action of deuteric fluids. The remarkably constant thickness of successive layers throughout the layered zone suggests that layering resulted from an internally self-regulating process(es). Oxygen isotope ratios of the surrounding gneiss indicate that the intrusion of the nepheline syenite did not cause extensive circulation of meteoric or magmatic hydrothermal fluids. (Auth. mod.)

E-48817

Moyes, A.B., Groenewald, P.B., Brown, R.W., **Isotopic constraints on the age and origin of the Brattskarvet intrusive suite, Dronning Maud Land, Antarctica**, *Chemical geology*, June 25, 1993 106(3/4), p.453-466.

The alkali granitoids of the Brattskarvet intrusive suite constitute the largest intrusion (100 sq km) post-dating Middle Proterozoic orogeny in the Sverdrupfjella region of the Maudheim tectonic province, western Dronning Maud Land. Rb-Sr whole-rock data indicate an intrusive age of 518 Ma ($R_o=0.7081$), and Sm-Nd whole-rock data an age of 522 Ma ($R_o=0.5111$). Rb-Sr mineralogical data (biotite, alkali feldspar, sphene) yield ages of 482-465 Ma. The intrusive age of the suite is strongly indicated to be 519 Ma, with subsequent cooling at 476 Ma. Pb-Pb whole-rock data yield no age information, but indicate a lower-crustal source with low U/Pb ratios. These data support field evidence that intrusion post-dated the early orogeny (Kibaran, 1100-1000 Ma), but predated the less intense deformation synchronous with the Ross or Pan-African event in Cambrian times. The country rocks, paragneisses of the Sverdrupfjella Group, retain a

Kibaran whole-rock Rb-Sr overprint of 1170 Ma ($R_o=0.7036$), as do gneissic xenoliths enclosed in the intrusion, 1046 Ma ($R_o=0.7105$). Sm-Nd and Pb-Pb whole-rock data from these rocks are equivocal; Pb-Pb whole-rock data indicate a source similar to upper-crustal rocks. U-Pb data from two zircon fractions extracted from the paragneiss confirm the dominance of Kibaran ages. Two hornfelsic xenoliths underwent complete Rb-Sr resetting during the magmatism, but have retained Sm-Nd characteristics of the country rocks. (Auth.)

E-48823

Palmer, J., Sempéré, J.C., Christie, D.M., Morgan, J.P., **Morphology and tectonics of the Australian-Antarctic Discordance between 123E and 128E**, *Marine geophysical research*, May 1993 15(2), p.121-152, Refs. p.151-152.

The Australian-Antarctic Discordance (AAD) is an anomalously deep and rugged zone of the Southeast Indian Ridge (SEIR) between 120E and 128E. The AAD contains the boundary between the Indian Ocean and Pacific Ocean isotopic provinces. Near the transform which bounds the AAD to the east, there is a marked change in the morphology of the spreading center, as well as in virtually every measured geochemical parameter. The spreading axis within the Discordance lies in a prominent rift valley similar to that observed along the Mid-Atlantic Ridge, although the full spreading rate within the AAD is somewhat faster than that of slow-spreading centers (about 74 mm/a vs. 0-40 mm/a). The AAD rift valleys show a marked contrast with the axial high that characterizes the SEIR east of the AAD. This change in axial morphology is coincident with a large (1 km) deepening of the spreading axis. The segmentation characteristics of the AAD are analogous to those of the slow-spreading Mid-Atlantic Ridge, as opposed to the SEIR east of the AAD, which exhibits segmentation characteristics typical of fast-spreading centers. Thus, the spreading center within and east of the AAD contains much of the range of global variability in accretionary processes, yet it is a region free from spreading rate variations and the volumetric and chemical influences of hotspots. It is suggested that the axial morphology and segmentation characteristics of the AAD spreading centers are the result of the presence of cooler than normal mantle. (Auth. mod.)

E-48827

Melles, M., Kuhn, G., **Sub-bottom profiling and sedimentological studies in the southern Weddell Sea, Antarctica: evidence for large-scale erosional/depositional processes**, *Deep-sea research*, Apr. 1993 40(4), p.739-760, Refs. p.758-760.

Low-frequency echo sounder profiles (3.5 kHz and Parasound systems), surface sediments, and sediment cores were taken from the continental margin of the southern Weddell Sea during 4 cruises of the R.V. *Polarstern* between 1985/86 and 1988/89. Nine sediment echo types were classified, mapped and interpreted, and verified using sedimentological data. The results provide evidence of large-scale erosional and depositional processes on the continental margin of the southern Weddell Sea. During the last glacial maximum, the antarctic ice sheet advanced to the continental shelf edge directly north of the Crary Trough, where it overdeepened the shelf by erosion. The supply of eroded material presumably initiated sediment gravity transport processes on the slope in the extension of the Crary Trough. A combination of high energy gravitational transport, such as by turbidity currents, and contour current activity probably caused westward migration of a zone of erosion along the steep, 200-400 m high western flank of an asymmetrical channel extending down the slope. Within the channel, predominantly coarse-grained sediments were deposited, whereas to the west of it, fine-grained levee sedimentation occurred on a sediment ridge. On the lower slope today, the current velocities of the remaining Ice Shelf Water are probably not strong enough to cause erosion along the steep western channel flank. (Auth. mod.)

E-48830

Hirvas, H., Nenonen, K., Quilty, P.G., **Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica**, *Quaternary international*, June 1993 Vol.18, p.81-95, 22 refs.

This paper presents results of a study of the formation, properties and stratigraphy of glacial deposits at the marginal zone of the East Antarctic ice sheet acquired during the 1988/1989 Australian National Antarctic Research Expedition. Samples (132) were collected for granulometric, geochemical, heavy mineral and various dating analysis. Fabric analyses (27) were performed from glacial till and debris-rich basal ice. Three test pits were excavated through frozen sediments to solid bedrock at a depth of 4.2 m. The whole ice free area of 410 sq km was studied by stereo interpretation of aerial photographs and reconnaissance field survey. Tills deposited by earlier phases of the Sörsdal glacier cover an interglacial deposit of shelly gravel near the Australian Davis Station. Shelly gravel represents clearly an ice free period when the climate was warmer and sea level higher than at present, and this stage is named the Davis interglacial. According to the thermoluminescence datings and amino acid analyses of the shelly gravel deposits, it seems that the age of the Davis interglacial could fall between 300,000 to 1,000,000 years BP. The glacial stratigraphy of the Vestfold Hills shows at least two similar Pleistocene outlet glacier 'floodings' during which the Sörsdal glacier drained the vast ice masses of the continental ice sheet beyond the Vestfold Hills antarctic oasis. (Auth. mod.)

E-48835

Rack, F.R., **Geologic perspective on the Miocene evolution of the Antarctic Circumpolar Current system**, *Tectonophysics*, July 15, 1993 222(3/4), p.397-415, Refs. 411-415.

Closely spaced whole-core measurements of bulk density are evaluated for 4 sites drilled in the southern ocean during Ocean Drilling Program (ODP) legs 113 (sites 689 and 690) and 120 (sites 747 and 751). These sites are all located on submarine rises in open-ocean (pelagic) depositional environments south of the Polar Front, a major oceanographic and sedimentologic boundary. High-resolution profiles of bulk density are used to correlate between adjacent drill holes on the Maud Rise, where multiple overlapping sedimentary sequences were recovered using the advanced hydraulic piston core barrel (APC). Stratigraphic age models have been applied to the bulk-density data to provide a temporal framework for a discussion of the sedimentologic basis for paleoceanographic interpretations, and also to constrain future acoustic research studies. (Auth. mod.)

E-48837

Ishman, S.E., **Circumantarctic benthic foraminifers**, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993 No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 2. Biogenic sedimentation. Edited by J.R. Bryan, p.105-133, Refs. p.131-133.

A key component to paleoenvironmental studies of antarctic marine deposits is the use of benthic foraminifer species and assemblage data. Although not as useful biostratigraphically as planktic foraminifers, southern ocean benthic foraminifers can also provide valuable biostratigraphic information, particularly in the Cretaceous and Paleogene. This chapter emphasizes circumantarctic smaller (63 to 200 micron) benthic foraminifers and their use as paleoenvironmental indicators. It covers general and specific biogeographic distributions, factors controlling the distribution and preservation of modern and fossil benthic foraminifers, and processing techniques for glaciomarine sediments.

E-48838

Leventer, A., Harwood, D.M., **Geologic use of polar marine diatoms**, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993 No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 2. Biogenic sedimentation. Edited by J.R. Bryan, p.134-253, Refs. p.168-178.

Most of the information on polar marine diatoms presented here has been summarized from the many references listed in the final section of this chapter. A few laboratory techniques for cleaning and mounting diatom samples are described. These include a technique for working with diatoms in water samples, a technique to clean sediment samples, a general technique for making permanent slides, and one for making quantitative diatom slides from sediment samples. The bulk of the chapter discusses taxonomy and identification of polar marine diatoms, their use in paleoclimatic reconstruction, their distribution, taphonomy and biostratigraphic use. Four appendices, including classification with illustrative line drawings and taxonomic keys for various diatom genera, conclude this chapter.

E-48839

Anderson, J.B., **Antarctic glacial-marine sedimentation**, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993 No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 1. Glacial-marine sedimentation. Edited by J.R. Bryan, p.1-88, Refs. p.83-88.

The United States' research effort to sample the antarctic sea floor, centered around expeditions of the USNS *Eltanin*, R/V *Vema*, R/V *Conrad*, the USCGC *Glacier*, and the R/V *Polar Duke*, has successfully acquired thousands of piston cores and bottom grab samples and thousands of kilometers of bottom-profiler and seismic-reflection data. The cores reside at the Antarctic Marine Geology Research Facility at Florida State University. The first chapter of the core workshop reported here used the collection of geological samples at the Research Facility to examine sedimentation on the antarctic sea floor, focusing on the subglacial environment.

E-48840

Domack, E.W., **Stratigraphy and paleoclimatic analysis of deep water antarctic glacial marine sediments**, *Florida State University. Sedimentology Research Laboratory. Contribution*, Mar. 1993 No.57, Workshop on antarctic glacial marine and biogenic sedimentation: notes for a shortcourse. Part 1. Glacial-marine sedimentation. Edited by J.R. Bryan, p.89-104, 14 refs.

Because of iceberg scouring and storm current activity, most of the depositional record of fine-grained sediment in antarctic waters is found within deep shelf basins or fjords on the continental shelf. These basins are generally between 500 and 1500 m deep and contain a detailed depositional history of the past 10,000 years or more. Results of a stratigraphic and geophysical study of such basins along the western Antarctic Peninsula, begun in 1990, are presented in this chapter. The major tools used to investigate the stratigraphic and paleoclimatic record included visual descriptions of freshly cut (<12 hours) cores, magnetic susceptibility, total organic carbon, biogenic silica, core x-ray radiography, AMS radiocarbon dating, and very high resolution seismic (HUNTEC) reflection profiling.

E-48841

Bryan, J.R., ed, **Descriptions of sediments recovered by the USCGC *Glacier*, USARP Operation Deep Freeze 1987: western Ross Sea, Florida State University. Sedimentology Research Laboratory. Contribution, Mar. 1993 No.56, 75p., Refs. p.68-73.**

This volume contains descriptions of cored sediments obtained during the 1986-1987 austral summer cruise of the U.S. Coast Guard icebreaker *Glacier*, which surveyed the western Ross Sea. This is the eighth and final volume to be published of sediment descriptions of material collected by the *Glacier* in antarctic waters since 1968. These are designed to serve the general geologic community by providing descriptive information of shallow sediments surrounding the continent of Antarctica, and to assist geoscientists wishing to pursue more detailed studies by serving as a guide for sediment sampling. Included are: a summary of the scientific objectives of the 1986-1987 cruise of the *Glacier*, a discussion of core and grab sample recovery and processing, a table and maps of station locations, an explanation of laboratory descriptive procedures, and lithologic descriptions of piston and trigger cores.

E-48843

Livermore, R.A., Woollett, R.W., **Seafloor spreading in the Weddell Sea and southwest Atlantic since the Late Cretaceous, *Earth and planetary science letters*, June 1993 117(3/4), p.475-495, Refs. p.493-495.**

Geosat radar altimetry defines a pattern of closely spaced curvilinear gravity anomalies in the northern Weddell Sea and adjacent parts of the southwest Atlantic. These anomalies are caused by a fracture zone pattern resulting from seafloor spreading, mainly on the southern flank of a ridge system which now exists only to the east of the South Sandwich Trench. Flowlines derived from these anomalies are combined with isochrons resulting from an interpretation of all available magnetic anomaly profiles in the region, to produce a new tectonic summary chart. This chart reveals major changes in spreading direction during the Cretaceous magnetic superchron, the latest Cretaceous/Paleocene (65 Ma) and the mid-Eocene (50 Ma). The latter two changes enclose a period of very slow spreading, and define a kink in the flowlines which is discernible throughout most of the Weddell Sea. Preliminary modeling indicates that trends from the western Weddell Sea to near the South Atlantic triple junction can be explained by the separation of just two plates. The data do not support the existence of a Late Cretaceous Malvinas Plate within the Weddell Sea, although microplates in the northernmost Weddell Sea do appear to have formed briefly as a result of interactions between the former spreading ridge and a subduction zone located at the South Scotia Ridge. (Auth. mod.)

E-48854

Smith, V.R., Steenkamp, M., **Macroinvertebrates and peat nutrient mineralization on a sub-antarctic island, *South African journal of botany*, Feb.1993 59(1), p.106-108, With Afrikaans summary. 8 refs.**

Moth larvae, earthworms and weevil larvae significantly enhance rates of nitrogen, phosphorus and potassium mineralization from peat on Marion I., as indicated by the amounts of inorganic forms of these elements released into solution in microcosms. Sodium release was unaffected by the animals and magnesium release was enhanced by moth larvae only. Lower release rates of calcium and magnesium occurred in the presence of weevil larvae, indicating immobilization. The other two species had no influence on calcium release. These results, together with those of a previously reported investigation of the role of invertebrates in litter nutrient release, show that macroinvertebrates are crucial agents of nutrient cycling. (Auth.)

E-48859

Turner, B.R., **Paleosols in Permo-Triassic continental sediments from Prydz Bay, East Antarctica, *Journal of sedimentary petrology*, July 1993 63(4), p.694-706, 69 refs.**

Paleosols in Prydz Bay, mainly in overbank siltstones and mudstones, are characterized by extensive destruction of sedimentary structures and the presence of mottles, rootlets, and rare chalky caliche. Because of the shallow depth of burial and limited compaction and diagenesis, the paleosols have retained most of their original microstructure and fabric. Micromorphological analysis of the paleosols reveals the presence of phreatic monopodial root systems, nodules, and a variety of soil structures and fabrics as well as a micritic root structure with alveolar texture. Most of the paleosols are weakly developed, with small, incomplete ped structures and lack of illuviation. They resemble weakly developed alluvial soils with A-C and B(C) profiles, and are similar to modern base-deficient inceptisols. The nature of the paleosols suggests relatively high permeabilities and water circulation during soil formation and a relatively mobile water table, with little reduction of iron except locally on the less well drained parts of the alluvial plain. Extensive pedogenic carbonate formation was precluded by the soil-moisture regime and relatively wet climate. During Late Permian and Early Triassic times Prydz Bay, which lay some 30 deg south of the Equator, experienced climatic conditions broadly similar to parts of the contemporary tropics, dominated by a subtropical high-pressure system, easterly winds, and seasonal rainfall. (Auth.)

E-48860

Wharton, R.A., Jr., Lyons, W.B., Des Marais, D.J., **Stable isotopic biogeochemistry of carbon and nitrogen in a perennially ice-covered antarctic lake, *Chemical geology*, July 20, 1993 107(1-2), p.159-172, 57 refs.**

This paper reports results of an analysis of the dissolved inorganic carbon (DIC) of Lake Hoare in the McMurdo Dry Valleys area, for $\delta^{13}\text{C}$ of the DIC indicates that C-12 is differentially removed in the shallow, oxic portions of the lake via photosynthesis. In the anoxic portions of the lake (27-34 m), a net addition of C-12 to the DIC pool occurs via organic matter decomposition. The dissolution of CaCO_3 at depth also contributes to the DIC pool. Except near the Canada Glacier, where a substantial amount of allochthonous organic matter enters the lake, the organic carbon being deposited on the lake bottom at different sites is isotopically similar, suggesting an autochthonous source for the organic carbon. Preliminary inorganic carbon flux calculations suggest that a high percentage of the organic carbon fixed in the water column is remineralized as it falls through the water column. At nearby Lake Fryxell, the substantial (relative to Lake Hoare) glacial meltstream input overprints Fryxell's shallow-water biological $\delta^{13}\text{C}$ signal with $\delta^{13}\text{C}$ -depleted DIC. In contrast, Lake Hoare is not significantly affected by surface-water input and mixing, and therefore the $\delta^{13}\text{C}$ patterns observed arise primarily from biological dynamics within the lake. Organic matter in Lake Hoare is depleted in N-15, which is thought to be partially from the addition of relatively light inorganic nitrogen into the lake system from terrestrial sources. (Auth. mod.)

E-48861

Foland, K.A., Fleming, T.H., Heimann, A., Elliot, D.H., **Potassium-argon dating of fine-grained basalts with massive Ar loss: application of the Ar-40/Ar-39 technique to plagioclase and glass from the Kirkpatrick Basalt, Antarctica, *Chemical geology*, July 20, 1993 107(1-2), p.173-190, 44 refs.**

Ar-40/Ar-39 incremental-heating measurements are reported for separated plagioclase and matrix fractions and a glass sample of the Kirkpatrick Basalt from Victoria Land. These results are used to address the limitations of whole-rock analyses of glassy or very fine-

grained basalts; the use of plagioclase for determining ages of such rocks; the Ar behavior of matrix, glass and feldspar components; the use of K/Cl ratios in interpretation of step-heating results; and the age of the Kirkpatrick Basalt. (Auth. mod.)

E-48868

Andronikov, A.V., Egorov, L.S., **Highly potassic basaltoids of the Manning Massif** [Vysokokalievye bazal'toidy massiva Manning], *Antarktika; doklady komissii*, 1992 No.30, p.31-41, In Russian with English summary. 6 refs.

This paper deals with basic findings of geological, petrographic and geochemical studies of olivine-leucite trachybasalts sequence occurring in the summit of the Manning Massif. The results show that the sequence consists of at least four separate sheets 2.5-6-7 m thick each. Each sheet contains (in ascending order): hyaline (chilled) base, thin-platy lava of the lower transition zone, fine-grained massive olivine-leucite trachybasalt with large spheroidal or hammock jointings, fine-grained amygdaloid lava of the upper transition zone, and mandelstones or scoria with abundant voids. Petrography of these parts of separate sheets is described in detail. The volcanic sequence itself builds up a V-shaped tectonic downthrown block along the faults; the block is a remnant of a large effusive terrain. The study yielded a correlation scheme of particular sections of rocks from different localities of the olivine-leucite trachybasalt terrain. (Auth.)

E-48869

Pisarevskii, S.A., Andronikov, A.V., **Paleomagnetism of ultrabasic and basic rocks of the Beaver Lake area** [Rezultaty predvaritel'nykh paleomagnitnykh issledovaniĭ ul'traosnovnykh i osnovnykh porod raĭona oz. Biver (Vostochnaia Antarktida)], *Antarktika; doklady komissii*, 1992 No.30, p.42-48, In Russian with English summary. 12 refs.

Data on geology of alkaline-ultrabasic and alkaline-basic rocks of the Beaver Lake area, as well as the main petrographic characteristics, are given. Particular emphasis is laid upon the rock paleomagnetism. Thirty-three specimens of magmatic rocks have been studied to determine the values of residual magnetization and the polarity for 8 intrusive bodies. The position of the south paleomagnetic pole has been determined from the features of a sill of polzenites in the Radok Lake area. Its age can be interpreted as early Cretaceous, which is in good agreement with the conclusions of Australian scientists who have extrapolated the paleomagnetic data on the Cretaceous rocks of Australia onto East Antarctica. (Auth.)

E-48870

Bardin, V.I., Kostiaev, A.G., **Geochemical studies of loose Cenozoic sediments of East Antarctica** [Opyt geokhimicheskogo izucheniia rykhlykh kaĭnozoĭskikh otlozhenii Vostochnoi Antarktidy], *Antarktika; doklady komissii*, 1992 No.30, p.49-57, In Russian with English summary. 15 refs.

The results are given of geochemical studies of loose Cenozoic sediments from the Prince Charles Mountains area. These consist of modern and ancient continental moraines, ancient glacio-marine sediments and stratified formations (presumably basal moraines sections, problematic from the point of view of their genesis), found on the Amery Ice Shelf. The composition of the absorbed rock complex and water-soluble compounds are analyzed. Geochemical descriptions of marine and continental sediments are given and on its basis, the origin of their formations is determined. It is established that all of them have been subjected to marine influence and must have been formed on the border between the land and the sea. This process took place in the early glacial period; paleogeographic conditions were quite different from those of the present time. (Auth. mod.)

E-48871

Bol'shiianov, D.IU., Verkulich, S.R., **New data on the development of Bunger Hills** [Novye dannye o razvitii oazisa Bangera (Vostochnaia Antarktida)], *Antarktika; doklady komissii*, 1992 No.30, p.58-64, In Russian with English summary. 7 refs.

As a result of geomorphological and paleogeographic investigations carried out in the Bunger Hills in 1987 and 1989, the first data on bottom sediments of fresh water lakes and marine bays, and the terrestrial sediments, have been obtained. The characteristics of birds and lichens settling have been noted. First C-14 dates of collected Pleistocene organic fossils (shells, algae and moss, and organic sediments of snow petrel nests) have also been obtained. On the basis of these data, the following features of the Pleistocene and Holocene periods of the oasis development have been established: the Early Holocene deglaciation of the territory and the absence of multiple glaciations in the Holocene; the probable appearance of small glaciers and snow fields in the Holocene; minor marine transgression in the Middle Holocene; and pre-Holocene transgression of the sea. A specific feature of the oasis development in the Holocene is the complex evolution of the lake system, accompanied by damming of the lakes, rushes and overflows of waters and considerable erosion activity of water flows. (Auth.)

E-48872

Shmideberg, N.A., **Hydrology and hydrochemistry of natural waters of East Antarctica** [Gidrologo-gidrokhimicheskie issledovaniia prirodnykh vod Vostochnoi Antarktidy (vklad v razvitie sovremennoi gidrokhimii)], *Antarktika; doklady komissii*, 1992 No.30, p.65-76, In Russian with English summary. Refs. p.75-76.

Hydrochemical data are given from a 30-year study of natural waters of East Antarctica (ice sheet, lake waters), showing three major problems of modern hydrochemistry. These are: atmospheric pollution; study of the formation regularities of natural waters chemical composition; and the reconstruction of the continental paleogeographic situation. Results are used to examine the processes of the formation of natural water chemical composition in the present and paleogeographic situations. (Auth.)

E-48901

Corner, B., Groenewald, P.B., **Gondwana reunited, South African journal of antarctic research**, 1991 21(2), p.172, 3 refs.

South African research in Queen Maud Land has facilitated comparison of this region with crustal provinces in southeastern Africa, revealing a considerable similarity in the evolution of these regions. A major Mid- to Late-Proterozoic orogenic terrain in Queen Maud Land, comprising the HU Sverdrupfjella and Heimefrontfjella regions, and termed the Maudheim Province, is very similar in age, lithology, structural style and metamorphic history to the Mozambique and Natal orogenic provinces of Kibaran age (1,000 million years) in southeastern Africa.

E-48902

Hunter, D.R., **Recent history of South African earth science research in Antarctica and adjacent regions**, *South African journal of antarctic research*, 1991 21(2), p.173-183, Refs. p.182-183.

Advances in geological and geophysical research in Antarctica and the southern ocean have contributed to an understanding of crustal evolution. Petrologic and structural studies of magmatic, metamorphic and sedimentary sequences have provided a more detailed base for geological correlations between western Queen Maud Land and southeastern Africa. Airborne geophysical surveys have identi-

fied prominent magnetic anomalies similar to those previously recognized in southern Africa, which corroborates these findings. Isotopic analysis has shown considerable similarity in the chronostratigraphy of the two continents. Marine geophysics and geochemical studies of ocean floor basalts have contributed to the elucidation of the spreading history and evolution of the southern ocean. (Auth.)

E-48953

Rees, P.M., **Mesozoic floras from northern Antarctic Peninsula**, *Académie des sciences, Paris. Comptes rendus. Série II*, June 3, 1993 316(11), p.1651-1657, With French abridged version. 19 refs.

The "classic" Mesozoic leaf flora from Hope Bay and a previously-undescribed one from nearby Botany Bay are the most diverse known of this age from the northern Antarctic Peninsula region. New work has shown that the floras are most probably Lower Jurassic and that most of the plants were buried in floodplain sediments, with occasional crevasse splay deposition. Previous interpretations of Mesozoic palaeogeography and volcanic arc evolution in the region had utilized an Early Cretaceous age for these floras. The revised age indicates that volcanic arc uplift occurred and an integral landmass existed in this area from Early Jurassic times onwards, rather than from the Early Cretaceous. (Auth.)

E-48961

Whitham, A.G., **Facies and depositional processes in an Upper Jurassic to Lower Cretaceous pelagic sedimentary sequence, Antarctica**, *Sedimentology*, Apr. 1993 40(2), p.331-349, 54 refs.

The Nordenskjöld Formation (?Oxfordian-Berriasian age) is exposed on the east coast of the Antarctic Peninsula, where it consists of interbedded ash layers and biosiliceous mudstones which accumulated under anaerobic to dysaerobic bottom waters. The mudstones were deposited by pelagic settling and the ash layers by pelagic settling from suspension or as fallout from subaerial eruption columns. The lower part of the succession accumulated in a basinal setting under anaerobic bottom waters and is characterized by parallel bedding. Mudstones deposited in this setting preserve abundant zooplankton faecal pellets. Compaction of these pellets has given rise to a bedding parallel fissility. The upper part of the succession accumulated under dysaerobic bottom waters in a slope setting. The sequence is wavy bedded and contains abundant evidence of post-depositional sediment instability and resedimentation, much of which was caused by tectonic activity. Discrete slide masses are absent from the slope sequence, and it appears that slope processes were dominated by creep. Examination of the mudstones shows that as levels of dissolved oxygen in bottom waters increase, pelleted mudstones give way to structureless mudstones before visible bioturbation is noted. (Auth.)

E-48965

Ten Brink, U.S., Bannister, S., Beaudoin, B.C., Stern, T.A., **Geophysical investigations of the tectonic boundary between East and West Antarctica**, *Science*, July 2, 1993 261(5117), p.45-50, 48 refs.

The Transantarctic Mountains (TAM), which separate the West Antarctic rift system from the stable shield of East Antarctica, are the largest mountains developed adjacent to a rift. The cause of uplift of mountains bordering rifts is poorly understood. One notion, based on observations of troughs next to many uplifted blocks, is that isostatic rebound produces a coeval uplift and subsidence. The results of an over-snow seismic experiment in Antarctica do not show evidence for a trough next to the TAM but indicate the extension of rifted mantle lithosphere under the TAM. Furthermore, stretching preceded the initiation of uplift, which suggests thermal buoyancy as the cause for uplift. (Auth.)

E-48967

Grunow, A.M., **New paleomagnetic data from the Antarctic Peninsula and their tectonic implications**, *Journal of geophysical research*, Aug. 10, 1993 98(B8), p.13,815-13,833, Refs. p.13,832-13,833.

New paleomagnetic data presented here further constrain the relative motion of the Antarctic Peninsula relative to East Antarctica during the Mesozoic development of the southern ocean basins. The Antarctic Peninsula (AP) is one of four crustal blocks that define West Antarctica, the others being the Ellsworth-Whitmore Mountains (EWM), Thurston Island-Eights Coast (TI), and Marie Byrd Land (MBL). A Jurassic pole (155 Ma) was obtained from the AP block which suggests that the AP block rotated clockwise between 175 and 155 Ma due to significant early opening in the Weddell Sea basin. A new Early Cretaceous paleomagnetic pole indicates that the AP block was in or near to its present-day position with respect to East Antarctica by 130 Ma. A 130 Ma pole from the TI block requires clockwise rotation of the TI and possibly the EWM blocks between 130 and 110 Ma, producing sinistral strike-slip motion between the EWM block and East Antarctica and dextral transpressional motion between the TI-EWM blocks and the AP block. New AP block 110 Ma and 85 Ma poles from this study are similar to equivalent age poles from East Antarctica, and suggest little or no relative motion between the Antarctic Peninsula and East Antarctica. (Auth. mod.)

E-48968

Dyment, J., **Evolution of the Indian Ocean Triple Junction between 65 and 49 Ma (Anomalies 28 to 21)**, *Journal of geophysical research*, Aug. 10, 1993 98(B8), p.13,863-13,877, Refs. p.13,876-13,877.

Reinterpretation of newly published geophysical data and older profiles of the Central Indian Basin, associated with similar studies of the Madagascar and Crozet basins, shows that the Indian Ocean Triple Junction trace on the Indian plate corresponds, at anomalies 23 and 22, to a N38E offset of the magnetic lineations, oblique to both the Southeast Indian Ridge (SEIR) and Central Indian Ridge (CIR) spreading directions. The conjugate Triple Junction trace on the African plate identified in the Madagascar Basin is associated with a roughly north-south offset, parallel to the Southwest Indian Ridge (SWIR) fracture zones. In order to account for these observations and the velocity triangle of the Indian, African, and antarctic plates close to the Triple Junction, a ridge-fault-fault mode is proposed, with a propagatorlike SEIR-CIR offset. The Triple Junction jumped between anomalies 24 and 23 and between anomalies 22 and 21, restoring a ridge-ridge-ridge configuration which immediately turned to a pseudo-ridge-ridge-fault and later to a true ridge-fault-fault configuration. (Auth. mod.)

E-48969

Marzocchi, W., Mulargia, F., **Patterns of hot spot volcanism**, *Journal of geophysical research*, Aug. 10, 1993 98(B8), p.14,029-14,039, Refs. p.14,038-14,039.

The aim of this paper is to identify the characteristic features, in terms of geophysically measured parameters, of the hot spot sites over the Earth's surface, including Antarctica. The authors use a pattern recognition approach which identifies associations as well as single parameters, and their statistical algorithm allows them to work at a given significance level, avoiding any overfit. The following parameters are used: absolute plate velocity of the site, minimum distance between neighboring hot spots, minimum distance from a ridge, minimum distance from a trench, geoid anomaly of harmonic degrees 2-10 and 11-36, area of the host plate, lithospheric thickness and stress state. The hot spots are generally defined as volcanoes not obviously related to plate boundaries. Results imply the existence of two main types of hot spot volcanism, the first one of sublithospheric origin with dynamics not influenced by surface tectonics, and the second one

mainly due to a favorably "soft" lithosphere. A third type would probably consist of "anomalous" and magmatically very productive parts of mid-ocean ridges. (Auth. mod.)

E-48970

Delisle, G., **Antarctic meteorites and global change** [Antarktische meteorite und global change], *Geowissenschaften*, Feb. 1993 11(2), p.59-64, In German with English summary. 19 refs.

Various methods are being applied to reveal the response of the ice cap of Antarctica to climatic changes in the past. Cores from deep drill holes through the polar ice contain information on temperature changes during the last glacial and interglacial stage. Glacial marks on rock outcrops, moraine deposits and marine sediments are under investigation as indicators of the extent and shape of the ice cap in the past. The investigation of meteorite traps on blue ice fields offers another possibility to pin down the reaction of the antarctic ice cap to varying climate during the last several hundred thousand years. (Auth.)

E-48973

Brook, E.J., Kurz, M.D., **Surface-exposure chronology using *in situ* cosmogenic He-3 in antarctic quartz sandstone boulders**, *Quaternary research*, Jan. 1993 39(1), p.1-10, 45 refs.

He-3 and Be-10 data from sandstone and granite boulders in the Dry Valleys region of Antarctica have been used to constrain the ages of an important moraine sequence formed by the Taylor Glacier. Data from these deposits also provide information about the systematics of He-3 in quartz that has important implications for geochronology based on He-3. In contrast to previous results from olivine and clinopyroxene, crushing quartz *in vacuo* releases helium with high He-3/He-4 ratios, indicating that crushing cannot be used to determine the isotopic composition of trapped (i.e., noncosmogenic) helium in quartz. Analysis of He-3 in different size fractions of the same samples indicates significant He-3 loss not predicted by existing He-3 diffusion data for quartz. The origin of the discrepancy is not clear, but loss from these samples is not as significant as suggested by the limited data of previous studies. (Auth. mod.)

E-48974

Brook, E.J., **Chronology of Taylor Glacier advances in Arena Valley, Antarctica, using *in situ* cosmogenic He-3 and Be-10**, *Quaternary research*, Jan. 1993 39(1), p.11-23, 22 refs.

This paper reports *in situ* measurements of He-3 and Be-10 in quartz sandstone boulders from Arena Valley, southern Victoria Land, to provide chronological constraints for a sequence of moraines related to expansions of Taylor Glacier and the East Antarctic Ice Sheet. Mean He-3 ages are 113,000 \pm 45,000 yr, 208,000 \pm 67,000 yr, 335,000 \pm 187,000 yr, and 1.2 \pm 0.2 myr, for Taylor II, III, IVa, and IVb moraines, respectively. Although the exposure ages appear consistent with the few previous age estimates, particularly with an isotope stage 5 age for Taylor II, each moraine exhibits a broad age distribution. The distribution probably results from a variety of factors, which may include prior exposure to cosmic rays, He-3 loss, erosion, postdepositional boulder movement, and radiogenic production of He-3. Nonetheless, the exposure ages provide direct chronological constraints for the moraine sequence, and suggest a maximum thickening of Taylor Glacier relative to the present ice surface of 500 m since the late Pliocene-early Pleistocene. (Auth. mod.)

E-48977

Frenot, Y., ***Azorella selago* Hook. used to estimate glacier fluctuations and climatic history in the Kerguelen Islands over the last two centuries**, *Oecologia*, Aug. 1, 1993 95(1), p.140-144, 26 refs.

This paper combines geomorphological observations and a new biological dating technique to propose a reconstruction of the cool and warm events in the Kerguelen Is. during the last two centuries. The usual dating methods, such as dendrochronology or C-14 dating, are not applicable on Kerguelen. Therefore, the radial growth of *Azorella selago* Hook., a cushion-forming Umbelliferae species, was used to estimate the absolute age of deglaciated areas. Glacial margins in the vicinity of the Glacier Ampère constitute the most complete chronosequence studied in this part of the world and illustrate 7 warming-cooling cycles. This new dating technique is validated by the close relationship between the calculated ages of these climatic events and the results of several studies in other circumantarctic regions. The Glacier Ampère reached its maximum extent at the end of the 18th century. Since 1799, two discrete phases may be distinguished: the first period (1799-1965) is characterized by small glacier fluctuations (1 km retreat overall) whereas in the second period (1966 to the present) the retreat is much more rapid (about 3 km). The current dramatic glacial retreat on Kerguelen is apparently related to a major change in climate, and could illustrate a more general southern hemispheric pattern of glacial fluctuations. (Auth. mod.)

E-48978

Hall, K., **Enhanced bedrock weathering in association with late-lying snowpatches: evidence from Livingston Island, Antarctica**, *Earth surface processes & landforms*, Mar. 1993 18(2), p.121-129, 34 refs.

An indication of the extent of weathering on different aspects of rock outcrops on Livingston I. was obtained by means of a Schmidt hammer, a cone indenter and measurement of weathering rind thickness. Results show that weathering, particularly chemical weathering, is enhanced on the lee side of outcrops where snow accumulates as a result of prolonged wetting by the melting snow. Rock moisture and temperature data indicate that the south-facing, snow-accumulation side of obstacles have high rock moisture levels and maintain relatively high temperatures. Whilst chemical weathering is greater on the leeward side of outcrops, mechanical processes are greater on the windward side. The presence of late-lying snow thus appears to exert a strong influence on weathering. (Auth.)

E-48995

Shimoyama, A., Naraoka, H., Matsubaya, O., Harada, K., **Carbon isotopic compositions in antarctic carbonaceous chondrites**, *Chemistry letters*, Feb. 1993 No.2, p.371-374, 10 refs.

This paper reports measurements of total carbon content and carbon isotopic composition in 33 specimens of antarctic carbonaceous chondrites, which are in the ranges of 0.02 to 2.49% and -16.9 to +0.9 per mill with mean values 1.31% and -5.8 per mill, respectively. The value -5.8 per mill is close to that for the average juvenile mantle carbon, but is 5.7 per mill higher than that for non-antarctic ones. (Auth. mod.)

E-48998

Weis, D., Frey, F.A., Leyrit, H., Gautier, I., **Kerguelen Archipelago revisited: geochemical and isotopic study of the Southeast Province lavas**, *Earth and planetary science letters*, July 1993 118(1-4), p.101-119, 56 refs.

In order to constrain an isotopically extreme mantle component involved in the genesis of oceanic basalts, some of the youngest lavas of the Kerguelen Archipelago were studied. According to a model developed earlier, these young lavas were derived from the Kerguelen mantle plume, with little if any depleted MORB component. The alkaline lavas in the Southeast Province of the Kerguelen Archipelago correspond to two main volcanic phases: (a) a 20-22 Ma old lower Miocene series with basalts and trachytes belonging to a mildly alkaline series comparable to the earlier mildly alkaline series, and (b) an upper Miocene series with basanites, tephri-phonolites and phono-

lites, forming a highly alkaline series. In both series, the evolved lavas and associated basalts/basanites overlap in isotopic ratios, although incompatible element abundance ratios in the evolved lavas were modified by fractionation of amphibole, Fe-Ti oxides, apatite and sphene. It is proposed that the isotopic characteristics of the upper Miocene lavas correspond to the pure Kerguelen plume signature. The Kerguelen plume therefore has an intermediate isotopic composition and corresponds neither to the EM I nor the EM II component. A continuum between EM I and EM II is expected for mantle contaminated by recycled continental crust or continent-derived material. (Auth. mod.)

E-48999

Heider, F., Körner, U., Bitschene, P., **Volcanic ash particles as carriers of remanent magnetization in deep-sea sediments from the Kerguelen Plateau**, *Earth and planetary science letters*, July 1993 118(1-4), p.121-134, 39 refs.

Carbonate sediments from the Kerguelen Plateau (ODP Leg 120) of Eocene to Pliocene age were investigated with rock magnetic, petrographic and geochemical methods to determine the carriers of remanent magnetization. Magnetic methods showed that the major magnetic minerals were titanomagnetites slightly larger than single domain particles. Submicrometer to micrometer-size grains of titanomagnetite were identified as inclusions in volcanic glass particles or as crystals in lithic clasts. Volcanic fallout ash particles formed the major fraction of the magnetic extract from each sediment sample. Three groups of volcanic ashes were identified: trachytic ashes, basaltic ashes with sideromelane and tachylite shards, and palagonitic ashes. These three groups could be equally well defined based on their magnetic hysteresis properties and alternating field demagnetization curves. There was no evidence of biogenic magnetofossils in the transmission electron micrographs, nor did the authors find magnetic particles derived from continental Antarctica. The presence of dispersed volcanic fallout ashes between visible ash layers suggests continuous explosive volcanic activity on the Kerguelen Plateau in the South Indian Ocean since the early Eocene. The resulting continuous fallout of volcanic ash is the source of the magnetic particles and thus responsible for the magnetostratigraphy of the nannofossil oozes drilled during Leg 120. (Auth. mod.)

E-49003

Birkenmajer, K., **Trinity Peninsula Group (Permo-Triassic?) at Hope Bay, Antarctic Peninsula**, *Polish polar research*, 1992 13(3-4), p.215-240, Refs. p.238-240.

The Trinity Peninsula Group (Permo-Triassic?) at Hope Bay, northern Antarctic Peninsula, is represented by the Hope Bay Formation, more than 1200 m thick. It is subdivided into 3 members. The Hut Cove Member (HBF₁), more than 500 m thick, is a generally unfossiliferous marine turbidite unit formed under anaerobic to dysaerobic conditions, with trace fossils only in its upper part; the Seal Point Member (HBF₂), 170-200 m thick, is a marine turbidite unit formed under dysaerobic conditions, with trace fossils and allochthonous plant detritus; the Scar Hills Member (HBF₃), more than 550 m thick, is a predominantly sandstone unit rich in plant detritus, probably formed under deltaic conditions. The Hope Bay Formation was folded prior to Middle Jurassic terrestrial plant-bearing beds (Mount Flora Formation), from which it is separated by angular unconformity. Acidic porphyritic dykes and sills cut through this Formation. Andean-type diorite and gabbro plutons and dykes (Cretaceous) intrude Hope Bay Formation, causing thermal alteration of its deposits in a zone up to several hundred m thick. All the above units are displaced by two systems of faults, an older longitudinal and a younger transversal, of late Cretaceous or Tertiary age. (Auth. mod.)

E-49004

Jerzmanska, A., Swidnicki, J., **Gadiform remains from the La Meseta Formation (Eocene) of Seymour Island, West Antarctica**, *Polish polar research*, 1992 13(3-4), p.241-253, 21 refs.

Isolated and fragmented jaws, a single *basioccipitale* and *vertebra* of Gadiformes, indeterminate family and genus, are described from Eocene sediments of the La Meseta Formation, Seymour I. Based on the dentition and other characters of both jaws, they are assigned the informal name of *Mesetaichthys*. The remaining isolated bones probably belong to the same form. (Auth.)

E-49005

Hara, U., **Cyclostomatous Bryozoa from the Polonez Cove Formation (Oligocene) of King George Island, West Antarctica**, *Polish polar research*, 1992 13(3-4), p.255-263, Refs. p.261-263.

An additional account of the Oligocene cyclostome Bryozoa has been made from the glaciomarine sediments of the Low Head Member (= *Pecten* conglomerate of Barton, 1965) of the Polonez Cove Formation on King George I. The following genera have been recognized for the first time in the Paleogene of Antarctica: *Crisia*, *Bicrisia*, *Exidmonea*, *Filisparia* and *Mecynocia*. Paleoeological interpretation of the bryozoan assemblage suggests that the fauna lived in shallow water at a depth of around 50 m. (Auth.)

E-49006

Gazdzicki, A., Stolarski, J., **Oligocene record of the coral *Flabellum* from Antarctica**, *Polish polar research*, 1992 13(3-4), p.265-272, 18 refs.

Solitary corals of the genus *Flabellum* are described from the Lower Oligocene glaciomarine strata of the Polonez Cove Formation, King George I. This is the oldest record of the genus from Antarctica. (Auth.)

E-49014

Leat, P.T., Storey, B.C., Pankhurst, R.J., **Geochemistry of Palaeozoic-Mesozoic Pacific rim orogenic magmatism, Thurston Island area, West Antarctica**, *Antarctic science*, Sep. 1993 5(3), p.281-296, Refs. p.295-296.

Thurston I. and the adjacent Eights Coast and Jones Mountains record Pacific margin magmatism from Carboniferous to Late Cretaceous times. The igneous rocks form a uniformly calc-alkaline, high-alumina, dominantly metaluminous suite; some relatively fractionated granitoids are mildly peraluminous. The magmas were hydrous, a result of subduction. Gabbros have compositions outside the range of mafic volcanic and hypabyssal rocks, as a result of cumulate processes. Trace element compositions of the mafic magmas range from a low La/Yb, Th/Ta end-member close to E-MORB in composition, perhaps contaminated by crust, to a high La/Yb, Th/Ta end-member, close to shoshonite, with a strong magmatic arc trace element character. This variation may be a result of mixing of tholeiitic and shoshonitic end-members. Most silicic rocks could have been generated batch-wise from mafic magmas by fractional crystallization of a phenocryst assemblage dominated by plagioclase, pyroxene +/- amphibole, as seen in the cumulates. Cessation of magmatism at about 90 Ma approximately coincided with collision of a spreading center between the Phoenix and Pacific oceanic plates with the continent margin subduction zone. (Auth. mod.)

E-49015

Mikhalsky, E.V., Sheraton, J.W., **Association of dolerite and lamprophyre dykes, Jetty Peninsula (Prince Charles Mountains, East Antarctica)**, *Antarctic science*, Sep. 1993 5(3), p.297-307, 27 refs.

A compositionally varied swarm of mafic dykes in the Jetty Peninsula area was emplaced about 320 Ma (K-Ar age). There are three major groups: Group 1 dykes range from transitional-alkaline dolerites to camptonites, Group 2 are trachydolerites, and Group 3 are diorite to quartz diorite porphyries. Group 1 dykes have very similar ratios of most incompatible elements, and were derived from the same (or a very similar) enriched lithospheric mantle source region with high Nb and Ta (i.e., OIB, ocean island basalt, characteristics). However, the presence of several distinct subgroups with different incompatible element abundances implies significantly different degrees of melting. Group 2 trachydolerites are much more fractionated, but were apparently derived from a similar, although somewhat more enriched source. Group 3 diorites are compositionally quite distinct and may have been derived by intracrustal melting. Enrichment of the mantle source(s) of Groups 1 and 2 dykes apparently occurred about the same time as high-grade metamorphism in the area, and may have been coeval with crust formation in nearby parts of Gondwana. (Auth.)

E-49018

Wang, D.D., Lin, Y.T., **Inspiration from study of antarctic meteorites. 1: Petrographic and compositional evidences for early continuous chemical fractionation of the solar nebula**, *Antarctic research*, June 1992 3(1), p.1-16, For Chinese version see E-48115. Refs. p.14-16.

Bulk concentration of Ir, Os, Co and other siderophile elements of metal phase in chondrites increase significantly with degree of oxidation, which together with Co content of kamacite and Fa content of olivine reveal a continuous variation of redox in chondrites. Intermediate groups of E/H, H/L, L/LL, and LL/C, lying between E and H, H and L, L and LL, LL and C, respectively, are proposed, based on Co content in kamacite, Fa value of olivine, Fs value of low Ca pyroxene, bulk concentrations of Ir, Os and Co of metal phase and other taxonomic parameters. The discovery of intermediate groups increases the number of chemical groups of chondrites from 9 to 13. Both the variation of redox in chondrites and the presence of the intermediate groups of chondrites suggest a continuous chemical fractionation in the primordial solar nebula. (Auth.)

E-49019

Shen, Y.B., **Non-marine Late Cretaceous depositional unit on King George Island, West Antarctica**, *Antarctic research*, June 1992 3(1), p.17-24, Refs. p.23-24.

A new lithostratigraphic unit, the Half Three Point Formation, is determined on an inlet of Fildes Peninsula. This formation consists of volcanic breccia, sediment tuff, tuffaceous siltstones and mudstones, about 5.5 m thick. Palynomorph assemblage is of Late Cretaceous age (Campanian-Maastrichtian). Isotopic age of the tuffites by the Rb-Sr whole rock method is 71.30 Ma. The calcite of sand-sized tuffites formed by calcitization during early diagenesis has a very light $\delta^{13}C$ -18 value of -26.24‰, PDB, and $\delta^{13}C$ -13 value of -5.130 to 5.631‰, PDB, suggesting that the calcitization is related to thermal freshwater originally. The tuffaceous mudstone contains lower B content of 48.4 ppm, corresponding to that of lacustrine mudstones. A low Sr-87/Sr-86 ratio (0.703189-0.703320) indicates tuffites of continental origin. Therefore, the formation may represent a lacustrine deposit under low energy and reducing environment. (Auth.)

E-49022

Liu, C., **Paleomagnetism of the Late Cretaceous and Early Tertiary rocks from Fildes Peninsula, West Antarctica, and its geotectonic significance**, *Antarctic research*, June 1992 3(1), p.40-49, 14 refs.

The paleomagnetism of 109 oriented samples collected from drill cores through 5 rock units of Late Cretaceous and Early Tertiary on Fildes Peninsula were systematically studied. These show that the paleomagnetic pole position of this area is different from the position

of Australia during the 55-45 Ma period. This means that at the breakup of Gondwana at 55-45 Ma, Australia was separated from it, drifting southward 20-30 deg and rotating 70-80 deg westward, and gradually arriving at its current position. The paleolatitudinal data suggest that the area studied may have been covered with land glaciers at that time. The apparent polar wandering path of Antarctica through this geological time is also roughly worked out. (Auth.)

E-49023

Cheng, X.H., Xia, W.P., Zhang, H.S., **Remobilization and accumulation of iodine in marine sediments, western antarctic ocean**, *Antarctic research*, June 1992 3(1), p.50-59, For Chinese version see E-47426. 15 refs.

Remobilization and accumulation mechanisms of iodine in marine sediments are studied. The result shows that iodine is characteristically rich in the organic fractions of bay and pelagic sediments. However, it may be associated with oxyhydroxide and adsorptive phases at higher levels at the continental shelf and in hemipelagic sediments. The environmental character of remobilization of iodine in surficial sediments is similar to that of iron, i.e. it is remobilized on anoxic conditions and converted into solid phases when it is in oxidizing conditions, though the iodine does not act as the electron acceptor. The processes of adsorption and oxidation are responsible for the value of I(t)/C(org) in excess of that of planktonic materials other than the organic fraction in surficial sediments. Based on the calculations and discussion, a new model for the remobilization and accumulation of iodine in marine sediments is proposed. (Auth.)

E-49024

Zhu, M., E, M.L., Liu, X.H., Zheng, X.S., **Isotopic age and stratigraphical correlation of volcanic rocks on Fildes Peninsula, King George Island**, *Antarctic research*, June 1992 3(1), p.60-70, For Chinese version see 20E-45468. 24 refs.

The ages of volcanic rocks from Fildes Peninsula have been determined with K-Ar, Ar-39/Ar-40, and Rb-Sr methods, showing the following: the age range of volcanism on the Peninsula is from Late Paleocene to Early or Mid-Miocene; the formation time for the volcanic rocks of the Jasper Hill Member is Late Paleocene; the volcanic rocks of the Agate Beach Member are the product of volcanic activities during Early Eocene; the geological age of the Fossil Hill Member is approximately from Mid-Eocene to Early Oligocene; and the formation time of the Block Hill Member is probably Early Mid-Miocene. (Auth. mod.)

E-49026

Xie, Y.Y., Guan, P., **On chemical weathering of weathering crust at the Great Wall Station region, Antarctica**, *Antarctic research*, Dec. 1992 3(2), p.8-27, 4 refs.

The chemical weathering process of the weathering crust on Fildes Peninsula was studied using the sedimentology method, covering change of minerals, biochemical behavior of elements, migration and enrichment regularities of elements, correlation between element geochemical behavior, and change of weathering potential of rocks. CW, SW, GW, TW, and WE weathering crusts developed on volcanic clastic rock, gray apatitic basalt with tuff, or basaltic bedrock. (Auth. mod.)

E-49027

Zhu, C., Cui, Z.J., **Mass movement in the Great Wall Station area, Antarctica**, *Antarctic research*, Dec. 1992 3(2), p.28-31, 7 refs.

Based on numerous field investigations on mass movement processes on Fildes Peninsula, the authors conclude that the slope mass movement and periglacial forms on the Peninsula have an internal relationship in genesis. Three main features are considered: all pat-

terns of mass movement are developed on the slope surface; different-order mass movement and periglacial types show their spatial-temporal distribution rules (their development stages); and the slope mass movements are developed from the periglacial-geomorphic processes. (Auth. mod.)

E-49028

Cui, Z.J., Xiong, H.G., **Quantitative field observation on frost physical weathering in the Great Wall Station area, Antarctic research**, Dec. 1992 3(2), p.32-37, 1 ref.

Field observation sites were set up to measure frost weathering of bedrock in the Great Wall Station area from 1988 to 1990. The results show the following: the weathering rate is higher in summer than in winter; it is greater in higher than in lower places; it is highest on the eastern and southeastern slopes; and it is greatest in higher mean-annual-air-temperature years than in the lower ones. (Auth. mod.)

E-49029

Li, J.Y., Zhang, Y.C., **Quaternary diatoms and cysts from Xihu Lake on Fildes Peninsula of King George Island, Antarctica, and their palaeoenvironments, Antarctic research**, Dec. 1992 3(2), p.38-44, 18 refs.

From a drill hole 2.6 m deep, made in the 1985-1986 season in Lake Xihu, which is located in the southern portion of Fildes Peninsula, a total of 102 samples of well preserved diatoms and cysts (Chrysophyta) were collected. A total of 131 species belonging to 21 genera, and 9 diatom assemblages, were determined. Based on the data obtained, the paleoenvironmental and paleoclimatological changes indicate the age to be Late Holocene. (Auth. mod.)

E-49030

Liu, G.N., Cui, Z.J., Xiong, H.G., **Coastal phenomena and isostatic uplift around Fildes Peninsula of King George Island, South Shetland Islands, Antarctica, Antarctic research**, Dec. 1992 3(2), p.45-55, 15 refs.

Based on field work on features of recently raised coasts on the South Shetland Is., 3 types are described: the fragmental coast, the rock coast, and the ice-cliff coast. The processes and forms of the fragmental coast formed by wave action with floating ice are discussed. The coasts are separated into two age groups, those over 20 m asl (older) and those under 20 m asl (younger); the mean uplift rate of the latter is 6.7 mm/year, which is higher than that of the continental coasts. (Auth. mod.)

E-49031

Xie, Y.Y., Cui, Z.J., **Environmental events on King George Island since the last glaciation, Antarctic research**, Dec. 1992 3(2), p.56-68, 13 refs.

The extension of the ice sheet on King George I. during the last glaciation has been an environmental event ever since. At that time, the South Shetland Is. were one large unified island; the ice mass on King George I. may have come from the Antarctic Peninsula. The models of ice retreat and ice advance events in the Holocene show that the ice sheet separated into three small ice caps and then disappeared gradually. At present, the retreating glacier rate is about 1.3 m/year. After the ice sheet retreat, isostatic compensation appeared in the exposed earth crust and 5-6 steps of uplifted marine terraces developed along the coast. The uplift rate of the crust is estimated to be 6-10 mm/year. (Auth. mod.)

E-49053

Wilch, T.I., Lux, D.R., Denton, G.H., McIntosh, W.C., **Minimal Pliocene-Pleistocene uplift of the dry valleys sector of the Transantarctic Mountains: a key parameter in ice-sheet reconstructions, Geology**, Sep. 1993 21(9), p.841-844, 17 refs.

This paper proposes that there has been little or no Pliocene-Pleistocene uplift of the dry valleys sector of the Transantarctic Mountains, on the basis of isotopic dating and mapping of *in situ* cinder-cone deposits on the walls of Taylor Valley. Twenty-seven Ar-40/Ar-39 incremental heating analyses on whole-rock samples from subaerially erupted olivine basanite volcanic outcrops of known elevations define 14 eruptions ranging in age from 3.89 to 1.50 Ma. Because Taylor Valley opens directly onto the Ross Sea, these results show that any surface uplift during the past 2.57 m.y. was <300 m. The conclusion of minimal uplift contradicts previous models of dramatic uplift and associated hypotheses that uplift caused climatic cooling and growth of a polar East Antarctic ice sheet. (Auth. mod.)

E-49097

Chen, X.B., **Permafrost around CGWS, Antarctica, International Conference on Permafrost, 6th, Beijing, China, July 5-9, 1993. Proceedings, Vol.1, Guangzhou, China, South China University of Technology Press, 1993, p.84-88, 4 refs.**

This paper presents details of permafrost thickness around the Chinese Great Wall Station, Fildes Peninsula. Except for some thawing areas under large lakes, the permafrost is distributed continuously, with a thickness of 20 m to 100 m and with a maximum thawing depth of 0.5 m to 1.8 m. Permafrost thickness is influenced by the landform, the thickness and duration of snow cover, as well as by soil moisture. A mass of ground ice with a thickness of 30 cm and an ice wedge with a height of 15 cm have been located and thawing intercalation is found in the permafrost. (Auth. mod.)

E-49098

Hall, K.J., **Rock temperatures from Livingston Island (maritime Antarctic): implications for cryogenic weathering, International Conference on Permafrost, 6th, Beijing, China, July 5-9, 1993. Proceedings, Vol.1, Guangzhou, China, South China University of Technology Press, 1993, p.220-225, 27 refs.**

The British Antarctic Survey has initiated a series of undertakings at various locations in the Antarctic in which cryogenic rock weathering parameters are monitored. The rock temperature component of the information database is presented for three sites on the ice-free Byers Peninsula of Livingston I. in the South Shetland Is. At these study sites, rock temperatures were monitored several times each day. In addition, climatic data regarding air temperature, radiation, humidity, wind speed and direction and moisture availability were also monitored. This information made it possible to undertake within- and between-site comparisons, and to consider the relationship of the various rock temperatures to climatic conditions. (Auth. mod.)

E-49099

Matsuoka, N., Hirakawa, K., **Critical polygon size for ice-wedge formation in Svalbard and Antarctica, International Conference on Permafrost, 6th, Beijing, China, July 5-9, 1993. Proceedings, Vol.1, Guangzhou, China, South China University of Technology Press, 1993, p.449-454, 28 refs.**

Dimensions and character of polygons and the underlying wedge structures were investigated in three permafrost regions. Polygons in the Sör Rondane Mountains are 3-5 m in diameter and mainly underlain by ice wedges. In Adventdalen, Svalbard, large polygons (7-30 m in diameter) accompany ice wedges, whereas smaller ones have only active-layer soil wedges. Despite large diameters (5-30 m), polygons in Linnédalen, Svalbard, are only underlain by active layer soil wedges. The depth of wedge is, on the whole, proportional to the spacing, but the relationship between the two dimensions is expressed by distinct regression lines for continuous and discontinuous perma-

frost regions. These results show that the polygon size can be indicative of the existence of an ice wedge, if the depth to the permafrost table and the temperature of permafrost are known. (Auth. mod.)

E-49100

Wang, Y.Q., Chen, X.B., **Profiles of freezing point and unfrozen water content around CGWS, Antarctica**, International Conference on Permafrost, 6th, Beijing, China, July 5-9, 1993. Proceedings, Vol.1, Guangzhou, China, South China University of Technology Press, 1993, p.689-693, 2 refs.

Experimental results from investigations conducted in the vicinity of the Great Wall Station show that the extreme value of freezing point and unfrozen water content occurs at different depths of sedimental cores. This suggests the potential of such cores in reconstructing paleoclimatic variations in the antarctic environment. (Auth. mod.)

E-49101

Zhu, C., **Development model of the periglacial landforms on slope land—taking the phenomena of periglacial landforms in the Tianshan Mountains, West Antarctica and the Andes as examples**, International Conference on Permafrost, 6th, Beijing, China, July 5-9, 1993. Proceedings, Vol.1, Guangzhou, China, South China University of Technology Press, 1993, p.826-831, 11 refs.

A development model of periglacial landforms on slope land is summarized based on the distribution characteristics of periglacial landforms in the Tianshan Mountains; King George I., West Antarctica; and the central Andes. Influences of climate, shape and slope orientation on the development of periglacial landforms are evaluated. (Auth. mod.)

E-49108

Meyer-Berthaud, B., Taylor, T.N., Taylor, E.L., **Petrified stems bearing *Dicroidium* leaves from the Triassic of Antarctica**, *Paleontology*, July 1993 36(2), p.337-356, 40 refs.

Anatomically preserved one to five year-old stems are described from a Triassic site in the central Transantarctic Mountains. They are assigned to *Kykloxylon fremouwensis* gen. et sp. nov. and are regarded as related to the corystosperm stem *Rhexoxylon* on the basis of wood and pith anatomy and leaf trace organization. *Kykloxylon* axes possess a solid vascular cylinder of secondary xylem of the *Dadoxylon* type, but lack centripetal wood and a narrow pith. The bases of leaves attached to one-year-old stems of *K. fremouwensis* are similar to the leaves of *Dicroidium fremouwensis* described from the same locality in Antarctica. The *Dicroidium/Kykloxylon* plant from Antarctica is branched and more complex than the hypothetical *Dicroidium/Rhexoxylon* plant reconstructed from disarticulated remains from the Ischigualasto Formation of Argentina. It is suggested that the *Dicroidium/Rhexoxylon* plant may have been dominant in western Gondwana, whereas the *Dicroidium* plants with *Kykloxylon* stems might have had a wider geographical distribution in Gondwana. (Auth.)

E-49158

Groeneweg, W.J., Beunk, F.F., **Petrogenesis of Cretaceous-Tertiary volcanic rocks from King George I.: implications for the magmatic-tectonic evolution of the South Shetland Is. region, West Antarctica**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.10-25, 18 refs.

Subduction-related Late Cretaceous to Early Miocene volcanic rocks were sampled in the surroundings of Admiralty Bay on King

George I. during the first Dutch Antarctic Expedition (1990-91). Petrographical and geochemical research on these samples, of which the initial results are summarized in this paper, will contribute to the present knowledge of destructive plate margin magmatism in relation to regional tectonics, to the study of the transition of subduction- to rift-related volcanism, to the knowledge of the composition of the local crust and mantle, and to the reconstruction of the paleoclimate of Antarctica. One of the major findings deduced so far from the magmatic rocks of the Admiralty Bay area is the temporal change in chemistry from relatively high potassium content in Late Cretaceous and Middle- to Late Eocene rocks to low potassium content in Late Oligocene and Early Miocene rocks. Based on a relationship between potassium content and depth of the Benioff seismic zone established in other destructive plate margin systems, the authors suggest that the top of the subducting oceanic plate moved to shallower depth below the Admiralty Bay area due to a major plate reorganization during Late Eocene and/or Oligocene times. (Auth. mod.)

E-49164

Dirks, P.H.G.M., **Constraints from the Vestfold Hills basement complex on the tectonics of the 1000 Ma mobile belt in East Antarctica**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.98-112, 29 refs.

Highgrade metamorphics of the 1000 Ma East Antarctic mobile belt inherently preserve little evidence of the belt's early tectonic history. However, adjacent Archean basement complexes such as the Vestfold Block did not undergo pervasive Late-Proterozoic reworking and therefore retained valuable information, not only regarding the 1000 Ma compressional events but especially with respect to the earlier evolution of the mobile belt which involved extension. Between 1400-1250 Ma, the Vestfold Block underwent east-west extension, characterized by pseudotachylite formation on normal faults at less than 15 km (4 Kbar) depth followed by the formation of shear zones with a normal sense of shear and dyke emplacement. During the 1000 Ma events the Vestfold Block was buried to 23-27 km (6-7 Kbar) and underwent amphibolite facies metamorphism, as compressional deformation resulted in only limited strains within the Vestfold Block itself. The extensional and compressional events in the Vestfold Block are the correlatives of an early episode of sedimentation and a later compressional granulite facies event in the adjacent Rauer Group and Larsemann Hills, both of which were part of the 1000 Ma mobile belt. (Auth. mod.)

E-49165

Verbers, A.L.L.M., Van der Wateren, F.M., **Glacial geology of Central and North Victoria Land, Antarctica**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.113-118, 10 refs.

The research reported here aimed to find evidence of the relationship between tectonic uplift of the Transantarctic Mountains and the glaciation and deglaciation history of the area during the Cenozoic. Two alternative models explaining the glacial history of the Transantarctic Mountains are discussed. The authors conclude that their results appear to support a dynamic ice sheet model.

E-49177

Lambeck, K., **Glacial rebound and sea-level change: an example of a relationship between mantle and surface processes**, *Tectonophysics*, July 30, 1993 223(1/2), p.15-37, 61 refs.

The problem of glacial rebound provides an outstanding example of the relationship between surface and mantle processes on time scales of 10^3 to 10^5 years. Changes in surface loading of ice and melt-water associated with the growth and decay of the great ice sheets

deform the surface of the planet and induce flow in the mantle. A measure of Earth's response to the changing surface loads and internal deformation is provided by observations of past sea levels relative to the present level, and inversion of these observations provide constraints on both the models of the rheological response of the Earth to loading and on models of the ice sheets. Constraints on ice sheet models include the total volume of the grounded ice at the time of maximum glaciation, the global rates of melting of the ice sheets, the thickness of the ice at maximum glaciation, the extent of ice cover over shallow seas such as the North Sea and the Barents Sea, and the role of Antarctica in the global ice balance. Constraints on mantle parameters include the effective lithospheric thickness and the effective viscosity of the mantle. Some recent results for both sets of parameters are discussed. (Auth.)

E-49182

Wörner, G., Fricke, A., Burke, E.A.J., **Fluid inclusion studies on lower crustal gabbroic xenoliths from the Mt. Melbourne volcanic field (Antarctica): evidence for the post-crystallization uplift history during Cenozoic Ross Sea rifting**, *European journal of mineralogy*, July/Aug. 1993 5(4), p.775-785, 25 refs.

Fluid inclusions have been studied in Mt. Melbourne xenoliths. Most of the inclusions are secondary, and only few are considered primary with respect to igneous crystallization. Textures indicate that secondary inclusions formed from complete necking-down of fluid-filled, healed cracks. Most inclusions contain almost pure CO₂. Other fluid components (N₂, hydrocarbons) are present in some inclusions. Histograms of homogenization temperatures for large secondary inclusions in plagioclase and pyroxene have maxima between 16 and 26, 12 and 18 deg. Inclusions in olivine were measured in one rock only from 0 to 10 deg. These results are interpreted as fluid entrapment and crack healing at different P-T conditions along the steep geotherm previously documented for the lower crust in the Ross Rift region, which followed metamorphic equilibration of these rocks at conditions of 900-1000 C and 3-5 kbar. Fluid inclusion data then indicate an uplift path for the lower crust from the early high-T conditions to a later stage of crack formation, fluid migration, and fluid entrapment around 300-400 C. Decompression and cooling are interpreted to be related to uplift and cooling of the lower crust in the Mt. Melbourne area during the formation of the Ross Sea Rift and uplift of the Transantarctic Mountains. (Auth. mod.)

E-49185

Shemesh, A., Macko, S.A., Charles, C.D., Rau, G.H., **Isotopic evidence for reduced productivity in the glacial southern ocean**, *Science*, Oct. 15, 1993 262(5132), p.407-410, 32 refs.

Records of carbon and nitrogen isotopes in biogenic silica and carbon isotopes in planktonic foraminifera from deep-sea sediment cores from the southern ocean reveal that the primary production during the last glacial maximum was lower than Holocene productivity. These observations conflict with the hypothesis that the low atmospheric carbon dioxide concentrations were introduced by an increase in the efficiency of the high-latitude biological pump. Instead, different oceanic sectors may have had high glacial productivity, or else alternative mechanisms that do not involve the biological pump must be considered as the primary cause of the low glacial atmospheric carbon dioxide concentrations. (Auth.)

E-49192

Hussain, S.M., Rao, V.D., Joshi, A., Pant, N.C., Parimoo, M.L., **Comment on the paper "Granites of Peterman Ranges, East Antarctica and implications on their genesis," and Reply**, *Journal of the Geological Society of India*, Feb. 1992 39(2), p.171-174, 7 refs. For paper being commented on, see E-47491.

The commenters (Hussain and Rao) note several statements in the paper which they perceive as discrepancies: rock type identification; lack of acknowledgement of the map compiler; discrepancy in the F term of FMA; discrepancy in amount of REE in the samples; use of the chemical identification method rather than the mineral method; and comparison of the Petermann rocks to those of Australia. The authors (Joshi, Pant, and Parimoo) defend their interpretations and provide the rationale leading to these interpretations.

E-49195

Holdsworth, B.K., Nell, P.A.R., **Mesozoic radiolarian faunas from the Antarctic Peninsula: age, tectonic and palaeoceanographic significance**, *Geological Society of London. Journal*, 1992 Vol.149, p.1003-1020, Refs. p.1018-1020.

New assemblages of radiolaria, including some of the few occurrences of high southern latitude Jurassic and Cretaceous radiolarian faunas, show that several localities in the LeMay Group of Alexander I. range in age from latest Jurassic-earliest Cretaceous to at least Albian. By demonstrating that sedimentation and deformation in the LeMay Group was diachronous, younging oceanwards to the northwest, these new age assessments support the model of the LeMay Group as an accretionary complex. Allochthonous latest Jurassic-earliest Cretaceous radiolarian assemblages with some supposed Tethyan affinities are present in the LeMay Group. In contrast, an *in situ* latest Jurassic assemblage from the Nordenskjöld Formation of the back-arc basin and a further Jurassic assemblage from a probable trench-slope basin have characteristics believed diagnostic of high latitudes. The biogeographic affinities of radiolarians from cherts in the LeMay Group accretionary complex suggest that both these cherts, and associated basalts, are far-travelled slices of the Phoenix plate. Rocks from the probable trench-slope basin, formerly assigned to the younger Fossil Bluff Group fore-arc basin sequence, now appear to be part of a new, previously unrecognized formation. (Auth. mod.)

E-49210

Storey, B.C., **Role of subduction-plate boundary forces during the initial stages of Gondwana break-up: evidence from the proto-Pacific margin of Antarctica**, Magmatism and the causes of continental break-up, edited by B.C. Storey, T. Alabaster and R.J. Pankhurst, Geological Society Special Publication No.68, London, The Geological Society, 1992, p.149-163, Refs. p.160-163.

A plate interaction model is proposed for the initial stages of Gondwana break-up, relating the broad zone of mantle melting to a reduction in subduction-plate boundary forces. The change from Gondwanide compression to lithospheric extension in the Jurassic may be linked to a change from shallow to steeply dipping subduction, and to a slowing of subduction rates caused by a change in plate boundary zone parameters. A possible reduction of compressive boundary stresses may have enabled unconfined, overthickened Permian-Triassic crust to extend because of gravitational instability, thus facilitating break-up. It is suggested that break-up was not plume-related, but was due to variations in the regional stress field associated with changing plate-boundary forces. The continental crust was placed under tension, with substantial lithospheric thinning and decompression melting of an enriched mantle source forming the broad linear zone of within-plate magmatism. The presence of a plume beneath the Karoo province may have thermally weakened the lithosphere and induced local rifting, contributing to, but not causing the eventual separation of East and West Gondwana. (Auth. mod.)

E-49221

Bucher-Nurminen, K., Ohta, Y., **Granulites and garnet-cordierite gneisses from Dronning Maud Land, Antarctica**, *Journal of metamorphic geology*, Sep. 1993 11(5), p.691-703, Refs. p.702-703.

The central sector of Mühlig-Hofmannfjellet in western Queen Maud Land is dominated by large intrusive bodies of predominantly orthopyroxene-bearing quartz syenites (charnockites). Metasedimentary rocks are rare; however, two distinct areas with banded gneiss-marble-quartzite sequences of sedimentary origin were found in 1989-90. Cordierite-bearing metapelitic gneisses from two different localities contain the characteristic mineral assemblage: cordierite + garnet + biotite + K-feldspar + plagioclase + quartz +/- sillimanite +/- spinel. Thermobarometry indicates equilibration conditions of about 650 C and 4 kbar. Associated orthopyroxene-garnet granulites, on the other hand, revealed pressures of about 8 kbar and temperatures of 750 C. The earlier granulite facies metamorphism is not well preserved in the cordierite gneisses as a result of excess K-feldspar combined with interaction with an H₂O-rich fluid phase, probably released by the cooling intrusives. These two features allowed the original high-grade K-feldspar + garnet assemblages to recrystallize as cordierite-biotite-sillimanite gneisses, completely re-equilibrating them. Phase relationships indicate that the younger metamorphic event occurred in the presence of a fluid phase that varied in composition between the lithologies. (Auth. mod.)

E-49223

Macdonald, D.I.M., Francis, J.E., **Potential for Cretaceous coal in Antarctica**, *Geological Society of America. Special paper*, 1992 No.267, Controls on the distribution and quality of Cretaceous coals. Edited by P.J. McCabe and J.T. Parrish, p.385-395, Refs. p.394-395.

Cretaceous sediments in the Antarctic have yielded diverse fossil floras, and a few occurrences of thin coal have been described. Their presence illustrates that the climate was favorable for plant growth, despite Antarctica's polar position, and there was good potential for organic matter accumulation. It is suggested that there is no *a priori* reason why Cretaceous coals should not have formed in Antarctica. It is probable that they have not been found because exposed upper Mesozoic sedimentary basins are in the Antarctic Peninsula region of West Antarctica, and were intimately related to a volcanic arc in Cretaceous times. High sedimentation rates in these active-margin basins probably led to clastic dilution of organic material. During the Cretaceous, coals were much more likely to have formed in basins along East Antarctica's passive margin. (Auth.)

E-49224

Riccardi, A.C., **Western South America and Antarctica, Jurassic of the circum-Pacific**. Edited by G.E.G. Westermann, Cambridge, U.K., Cambridge University Press, 1992, p.122-161, Refs. p.153-161.

The last three pages of this chapter are dedicated to Antarctica. Marine Jurassic rocks in Antarctica are confined to the Antarctic Peninsula region and the neighboring South Shetland Is. For much of Mesozoic and Cenozoic time the peninsula was an active magmatic arc that formed part of the Pacific margin of Gondwana. This review concentrates on the marine sequences of the peninsula region and their stratigraphically diagnostic invertebrate faunas.

E-49234

Storey, B.C., **Upper Proterozoic rift-related rocks in the Pensacola Mountains, Antarctica: precursors to supercontinent breakup?**, *Tectonics*, Dec. 1992 11(6), p.1392-1405, Refs. p.1404-1405.

Sedimentological and structural studies in the Pensacola Mountains suggest that upper Precambrian clastic sedimentary rocks of the

Patuxent Formation and associated bimodal volcanic rocks formed in an intracontinental rift setting. The turbidities of the Patuxent Formation are part of a large depositional system, derived from a continental source. Interbedded pillow basalts and basaltic sills have trace and rare earth element signatures enriched relative to mid-ocean ridge basalt and similar to some rift-related tholeiitic suites. Nd and Sr isotopic values are compatible with derivation from a lithospheric mantle source in a continental setting. Associated felsic volcanic rocks have crustal trace element and isotopic characteristics. The rifting may have been a prelude to the fragmentation of a supercontinent and, according to recent hypotheses, the separation of Laurentia from Antarctica. Comparisons between the late Precambrian and Cambrian records of western North America and Antarctica suggest that, if these were conjugate margins, separation must have been Neoproterozoic rather than Cambrian in age. (Auth.)

E-49235

Asami, M., Osanai, Y., Shiraishi, K., Makimoto, H., **Metamorphic evolution of the Sör Rondane Mountains, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.7-15, Refs. p.13-15.

The Sör Rondane Mountains are underlain by a high-grade migmatized gneissic complex, intruded by granitic and syenitic plutonic rocks. Regional metamorphism in the granulite-facies is indicated by the common occurrence of mineral assemblages. Among the granulite-facies rocks, some pelitic rocks contain mineral associations suggestive of prograde and retrograde episodes during the regional metamorphism of medium-pressure type. The regional metamorphism was followed by a low-pressure contact metamorphic event, as suggested by the local development of granoblastic and andalusite and cordierite in some pelitic rocks adjacent to the acid plutonic intrusives, and by the *P-T* values around 550 C and 3 kbar obtained from mineral compositions. These observations constrain the Sör Rondane *P-T* trajectory to a clockwise type for the regional metamorphism, and a near-isothermal decompression path with subsequent isobaric heating during the contact metamorphism. Geochronologic data suggest ages near 1000 Ma for the earlier, mostly granulite-facies metamorphism, and ages near 500 Ma for the later low-*P* plutonometamorphic activity after uplift. (Auth. mod.)

E-49236

Osanai, Y., **Geochemical characteristics of metamorphic rocks from the central Sör Rondane Mountains, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.17-27, 40 refs.

The central Sör Rondane Mountains consist mainly of Proterozoic granulite- and amphibolite-facies metamorphosed basic and intermediate igneous rocks and metasedimentary rocks. These metamorphic rocks can be structurally divided into 6 lithologic units numbered I-VI from north to south and separately by faults with mylonite zone. The units I-IV and units V-VI are the granulite- and amphibolite-facies metamorphosed terranes, respectively. The boundary between the two terranes is named the Sör Rondane Suture (SRS). Applying various discrimination diagrams, basic metamorphic rocks from unit I show MORB-type affinity, where some oceanic type supracrustal rocks also occur. The island-arc basalt (IAB)-type basic metamorphic rocks occur in units II and VI with intercalations of island-arc andesite (IAA)- and continental margin andesite (CMA)-type intermediate metamorphic rocks, respectively. In units III, IV and V there are mixtures of oceanic- and island arc-type basic and intermediate metamorphic rocks. The geochemical characters of the protoliths from each unit are clearly different as follows: unit I: oceanic type, unit II: island-arc type, units III-V: accretional complex type and unit VI: continental margin island-arc type. The protoliths formed before 1000 Ma and faulted at 550-530 Ma. This

deformation was followed by A-type granitic activity in the tectonic environment of the active plate margin. (Auth.)

E-49237

Shiraishi, K., Kagami, H., **Sm-Nd and Rb-Sr ages of metamorphic rocks from the Sör Rondane Mountains, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.29-35, 18 refs.

New Sm-Nd and Rb-Sr data are reported for the granulite facies metamorphic rocks from the Sör Rondane Mountains. The Rb-87/Sr-86 ratios for most whole-rocks samples are low (0.02-0.15) and no meaningful isochron can be drawn due to isotopic scatter. Four enderbitic gneisses and two mafic granulites, however, define an isochron of 978 ± 52 Ma with initial Rb-87/Sr-86 ratio of 0.70426. The Nd-143/Nd-144 vs. Sm-147/Nd-144 ratios for all 10 whole-rock samples define an isochron of 961 ± 101 Ma with an initial ratio of 0.51153. Model ages with respect to the depleted mantle range from 1102 to 1291 Ma. The Rb-Sr isochron yields the age of granulite facies metamorphism associated with pronounced Rb depletion. If the Sm-Nd data are indicative of protolith age, it means there was a short time from crustal formation to granulite facies metamorphism. The Sm-Nd internal mineral isochron for an enderbitic gneiss yields 624 ± 18 Ma with an initial ratio of 0.51193. The Rb-Sr internal mineral isochron for the same sample without biotite data is 556 ± 26 Ma with an initial ratio of 0.70510; the age recalculated without hornblende data is 483 ± 12 Ma with an initial ratio of 0.70520. These ages are attributed to the successive thermal events associated with granite intrusion. (Auth.)

E-49238

Takigami, Y., Funaki, M., Tokieda, K., **Ar-40/Ar-39 geochronological studies of some paleomagnetic samples of East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.61-66, 25 refs.

Ar-40/Ar-39 geochronological studies were performed for five samples collected for paleomagnetic studies from the Sör Rondane Mountains, Ongul I. and Lambert Glacier area. The results indicate ages of 443-546 Ma for biotite, hornblende and whole rock of syenite. These ages are consistent with those obtained in previous studies, and imply that igneous activities at about 500-550 Ma seem to have continued for a relatively long time until about 360 Ma. Present results suggest a possibility of young igneous activities in the investigated area, which might affect the interpretation of the Ar-40/Ar-39 stair-type age spectrum for K-feldspar minerals of the Sör Rondane Mountains, and the movement of the virtual geomagnetic pole obtained for samples from East Antarctica between 500 Ma and 400 Ma. (Auth.)

E-49239

Shiraishi, K., **First report of a Cambrian orogenic belt in East Antarctica— an ion microprobe study of the Lützow-Holm Complex**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.67-73, Refs. p.72-73.

Ion microprobe U-Pb ages of zircons in metasedimentary and metaigneous rocks from six widely separated localities throughout the Lützow-Holm Complex (LHC) show that the timing of regional metamorphism and folding in the LHC was between 520 Ma and 555 Ma as recorded by new growth of metamorphic zircon. The authors report for the first time the existence of a Pan-African mobile belt within the East Antarctic Shield. The U-Pb ages tend to become younger towards the west, which correlates with westward increase in grade of regional metamorphism. It is suggested that the overall thermal structure of the metamorphism controlled the time of crystallization of the newly formed zircon component. Many zircons contain centers which record a wide range of inherited ages from 2900

to 1500 Ma. A 1000 Ma zircon component has been identified in three locations. This may indicate that either the 1000 Ma adjoining Rayner Complex to the east was a source for the Lützow-Holm paragneisses, or that a similar crustal prehistory is recorded in parts of the LHC. Results provide additional evidence for an improved fit to the once contiguous fragments of Gondwana. The Highland Series and Southwestern Group of Sri Lanka have remarkable petrological similarities to the LHC. This is now supported by the identification of 500-600 Ma age for both the LHC and Sri Lankan (Highland Series and Southwestern Group) metamorphism. (Auth.)

E-49240

Ogo, Y., Hiroi, Y., Prame, K.B.N., Motoyoshi, Y., **New insight of possible correlation between the Lützow-Holm Bay granulites (East Antarctica) and the Sri Lankan granulites**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.75-86, Refs. p.84-86.

A detailed petrological study was made on Sri Lankan pelitic granulites to reveal their metamorphic evolution, which would be helpful in understanding the geological evolution of East Antarctica. The central-western part of southern Sri Lanka is divided into three areas, A-C, based on the lithological and petrographical characteristics as well as the distinctively different neodymium model ages. Results suggest that rocks in area A began to cool at high pressures while those in areas B and C experienced nearly isothermal decompression due to slow exhumation and recovery of geotherm. Retrograde andalusite occurs throughout the areas. These petrological data, together with the existing petrological data on the Lützow-Holm Bay granulites and the recent geochronological data on both Sri Lanka and the region around Lützow-Holm Bay, strongly suggest that the Highland/Southwestern Complex in Sri Lanka and the Lützow-Holm Complex in East Antarctica were once contiguous and formed in the same Latest Proterozoic to Early Paleozoic orogenic belt in Gondwana. The data may also give a clue to the relationship between the Lützow-Holm Complex and neighboring Rayner and Yamato-Belgica Complexes. (Auth. mod.)

E-49241

Hensen, B.J., Motoyoshi, Y., **Osumilite-producing reactions in high temperature granulites from the Napier Complex, East Antarctica: tectonic implications**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.87-92, 25 refs.

Osumilite-sapphirine-garnet-sillimanite-alkali feldspar-quartz-phlogopite-bearing granulites from Mt. Riiser-Larsen contain evidence for the early stability of sapphirine-alkali feldspar-quartz. This assemblage is later replaced by osumilite-garnet-sillimanite, but armored relics of sapphirine enclosed in garnet or sillimanite remain. The reaction textures preserved in these rocks and the delicate sapphirine-quartz-orthopyroxene symplectites after cordierite, described previously from the same locality, indicate an increase in pressure and temperature during, or after, the tectonic event (or events) that coincide with the very high temperature (>1000 C) granulite facies metamorphism. It is suggested that the textures developed in a separate second heating event caused by intraplating of gabbro-anorthosite plutons, probably above the present level of erosion. This inferred magmatic event reheated and further buried the underlying supracrustal section without causing any penetrative deformation. Because of this lack of deformation, and the exceptionally dry conditions during reheating, reaction textures bearing witness to the pressure-temperature history of the rocks were preserved. (Auth.)

E-49242

Thost, D.E., Motoyoshi, Y., Hensen, B.J., **Mode of occurrence, geochemistry and mineral textures of mafic to ultramafic rocks from the Bölingen Islands, Prydz Bay, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.113-118, 21 refs.

Sparsely distributed mafic to ultramafic granulite lenses and boudins occur included in metapelitic and quartzo-feldspathic gneisses in the Bölingen Is. The rocks are chemically similar to ultramafic cumulates, having high Mg/Mg+Fe₂(pos) ratios (0.83- 0.89), and high Cr (up to 4914 ppm) and Ni (up to 926 ppm) contents. They probably represent remnants of boudinaged dykes or sills of ultramafic rock types. In one of the ultramafic boudins, spinel is rimmed by plagioclase and olivine coronas and symplectites. Plagioclase and olivine form by the reaction: orthopyroxene + clinopyroxene + spinel = plagioclase + olivine. This reaction, which constitutes the transition between the spinel and plagioclase-peridotite stability fields, produces plagioclase and olivine with decreasing pressure. The textures are consistent with near isothermal decompression immediately after mid-crustal (5-7 kbar) granulite metamorphism for the Bölingen Is. terrane. (Auth.)

E-49243

Funaki, M., Saito, K., **Paleomagnetic and Ar-40/Ar-39 dating studies of the Mawson charnockite and some rocks from the Christensen Coast**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.191-201, 19 refs.

Paleomagnetic studies were carried out on rocks collected from the Mawson Station area, Scullin Monolith, Larsemann Hills and Vestfold Hills. Reliable NRM of reversed polarity were obtained from Mawson charnockite, granitic gneiss from Scullin Monolith and biotite gneiss from Larsemann Hills. The VGP positions obtained from the Mawson charnockite and the granitic gneiss are consistent with the Ordovician APWP of Gondwana. However, the VGP from the biotite gneiss did not fit on the APWP. A geochronological study was also performed on the charnockite from Mawson Station. The ages of magnetic fraction in the sample were determined to be 475 ± 15 Ma by the K/Ar method and 445 ± 27 Ma as an Ar-40/Ar-39 isochron age with a trapped Ar-40/Ar-36 ratio of 1222. Based on this trapped ratio, a well-defined plateau age of 444 ± 18 Ma was obtained. These results indicate that the rocks from the Christensen Coast area were cooled down almost uniformly in the Ordovician in Gondwana. The alignment of NRM declinations reported from rocks in Showa Station, Mawson Station, Larsemann Hills, and Mirny Station suggests that the Lambert graben opened without rotational motion of Queen Maud Land with respect to Wilkes Land in East Antarctica. (Auth.)

E-49249

Moriwaki, K., Hirakawa, K., Hayashi, M., Iwata, S., **Late Cenozoic glacial history in the Sör Rondane Mountains, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.661-667, 23 refs.

A large part of the Sör Rondane Mountains was once covered by the antarctic ice sheet. The mountains are in places mantled with variously weathered tills. Large crystals of gypsum found in deep glacial depressions suggest the existence of lakes in a former warmer period. Based on the distribution, characteristics, and degree of weathering of the tills, and the Be-10 and Al-26 rock exposure dating, the glacial history of the Sör Rondane Mountains area is reconstructed as follows: the mountains were covered by a wet-based ice sheet prior to late Pliocene; deglaciation took place and the greater part of the mountains was exposed during mid-Pliocene; the ice sheet changed to

a dry-based one and re-advanced to about 100 m higher than the present ice surface during the early Pleistocene; and since middle Pleistocene, the ice sheet has retreated to its present margin with only minor fluctuations. A warmer climate period probably occurred during the late Pleistocene. (Auth.)

E-49250

Moriwaki, K., Yoshida, Y., Harwood, D.M., **Cenozoic glacial history of Antarctica—A correlative synthesis**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.773-780, Refs. p.778-780.

Knowledge of the Late-Cenozoic glacial history of Antarctica has increased rapidly over the last 10 years. In this paper the authors compile published data into figures in an attempt to present a provisional analysis of Cenozoic glacial history on a continent-wide scale. The main purpose is to identify the variety of opinions and areas where more data are needed. This task is approached through the development of figures that visually correlate glacial and marine events from diverse sets of data. (Auth.)

E-49263

Kuo, B.Y., **Thermal anomalies beneath the Australian-Antarctic discordance**, *Earth and planetary science letters*, Sep.1993 119(3), p.349-364, 42 refs.

The Australian-Antarctic Discordance shows SS-S residuals that are 3-8 s faster than the adjoining segments 1500-2000 km away. The large variability suggests that thermal structure in the upper mantle, as opposed to crustal structure, is the major cause of the velocity anomaly. Geoid and topography are inverted into temperature perturbations beneath the ridge within specific depth extents, assuming that the thermal sources and the geophysical observations are dynamically related in a viscous earth. The joint inversion of these two sets of data is robust, demanding a negative temperature anomaly of 80 and 250 C beneath the discordance, for layers extending from the surface to depths of 300 and 100 km, respectively. In a forward sense, the temperature so constrained predicts well the trend of the along-axis variations in SS-S residuals, but with a smaller amplitude, especially for the 8 s contrast between the discordance and the eastern end of the ridge where unusually high residuals sample a broad, shallow region of ridge segments. Considering the proximity of the SS bounce points to the ridge axis and the possibility of sampling a partial melt zone, the discrepancy in magnitude may be partially reconciled by deducting a presumed 2-3 s melt effect from the high residuals in the eastern end. The resolved thermal perturbations drive asthenospheric flow along the ridge, the flow converging and descending in the vicinity of the discordance. (Auth. mod.)

E-49272

Goodwin, I.D., **Holocene deglaciation, sea-level change, and the emergence of the Windmill Islands, Budd Coast, Antarctica**, *Quaternary research*, July 1993 40(1), p.70-80, 27 refs.

A Holocene deglaciation sequence for the Windmill Is. was determined from the C-14 age of raised marine shorelines, lake-bottom sediments, and Adélie penguin remains found in abandoned rookeries. A north-south gradient in the elevation of the upper marine limit was observed, with the highest marine limit (31-32 m) observed on Browning Peninsula and Holl I. at the southern edge of the islands. Correspondingly, the southern islands were found to have been deglaciated by 8000 (corr.) yr B.P. while the northern islands were deglaciated by 5500 (corr.) B.P. Isostatic uplift rates were calculated as 0.5 to 0.6 m/100 yr, with an estimated total uplift of around 53 m. This indicates late Pleistocene ice sheet thicknesses of 200 and 400 m over the islands and adjacent Petersen Bank, respectively. The margin of the

Late Pleistocene grounded ice sheet extended an estimated 8-15 km offshore, which coincides with the location of the 200 m isobath. (Auth.)

E-49277

Diester-Haass, L., Robert, C., Chamley, H., **Paleoceanographic and paleoclimatic evolution in the Weddell Sea (Antarctica) during Middle Eocene-Late Oligocene, from a coarse sediment fraction and clay mineral data (ODP Site 689), *Marine geology*, Oct. 1993 114(3-4), p.233-250, Refs. p.248-250.**

In the Middle Eocene, smectite-rich sediments were a consequence of warm climate with alternating wet and dry seasons on the antarctic margins. Productivity in the Maud Rise area of the southern ocean was low: no opal was deposited, preservation of carbonate is very good. Carbonate preservation shows cyclic changes; clinoptilolite is a common mineral. At the Middle/Late Eocene boundary (40.8 Ma), productivity suddenly increased enough to allow preservation of opal skeletons. Clinoptilolite disappeared where opal appeared. Illite appearance points to cooling of antarctic climates. In the Late Eocene, cyclic changes in productivity (cycle length 0.42 Ma) were associated with clay mineral compositional variations: sediments from colder, highly productive periods generally contain more illite and less smectite than warmer ones. The Early Oligocene was a period of very high productivity. Highest opal accumulation rates correspond to strongest carbonate dissolution. In the Late Oligocene, the intensity of physical weathering on Antarctica was stronger, as documented by increasing fluxes of illite, muscovite, amphiboles and talc. (Auth. mod.)

E-49278

Yao, X.L., Taylor, T.N., Taylor, E.L., **Triassic seed cone *Telemachus* from Antarctica, *Review of palaeobotany and palynology*, 1993 Vol.78, p.269-276, 30 refs.**

The compressed conifer seed core *Telemachus elongatus* is described from the Upper Triassic of Antarctica. The ovate cone measures up to 4.0 cm long and 4.0 cm wide, and contains helically arranged cone scale complexes. Each cone scale consists of an elongated bract fused to a 5-lobed ovuliferous scale. Two or three slightly reflexed ovules are borne on the adaxial surface of the ovuliferous scale. The cone scale cuticle is thin and possesses monocyclic stomata; cuticles are present on the ovules as well. These specimens represent the first record of an early conifer reproductive axis from the Triassic of Antarctica, and confirm that the early conifers were distributed southward to Antarctica by the early Mesozoic. (Auth.)

E-49289

Wilch, T.I., **Surficial geology and geomorphology of middle Taylor Valley, Antarctica: implications for Plio-Pleistocene antarctic history, Orono, ME, University of Maine, 1991, 363p., M.Sc. thesis. 100 refs.**

Twenty-five alkalic olivine basalt volcanic units associated with the McMurdo Volcanic Group were mapped in middle Taylor Valley. Most map units are interpreted as largely eroded cone remnants; one fully intact cone exists east of Rhone Glacier. The volcanic rocks include bright red deuterically oxidized lava flow breccias, welded bombs, and welded lapilli, all characteristic of subaerial, Strombolian eruptions; features of subaqueous or subglacial eruptions are absent in the outcrops. The chronology of the volcanic deposits is based on Ar-40/Ar-39 incremental heating analyses of ninety whole-rock basalt samples. Fourteen volcanic events are inferred, ranging in age from 1.50 to 3.89 Ma. It is also inferred that the alpine glaciers were no larger and were probably smaller at the time of the eruptions than they are today. Because Taylor Valley is open to the Ross Sea, the lowest elevation of a subaerially erupted volcanic outcrop defines the maximum possible uplift of the outcrop since its eruption. It is assumed that eustatic sea level was no lower prior to 2.4 Ma that it is

today, as Northern Hemisphere ice sheets did not exist prior to 2.4 Ma. (Auth. mod.)

E-49304

Harvey, R.P., Wadhwa, M., McSween, H.Y., Jr., Crozaz, G., **Petrography mineral chemistry, and petrogenesis of antarctic Shergottite LEW88516, *Geochimica et cosmochimica acta*, Oct. 1993 57(19), p.4769-4783, 43 refs.**

This paper presents a detailed examination of the petrology and mineral chemistry of two antarctic meteorites, designated as LEW88516 and ALHA77005, and considers the possibility that they derived from separate falls, and thus could not represent igneous remnants of the same extraterrestrial magmatic source.

E-49313

Ebihara, M., Hirano, K.I., Ozaki, H., **Distribution of REEs in HCL/HNO₃-residues of antarctic UOCs and its implications to their metamorphic geneses on UOC parent bodies, *Geochemical journal*, 1992 26(6), p.425-434, 31 refs.**

In order to understand the metamorphic history of the parent bodies of unequilibrated ordinary chondrites (UOCs), REE distributions are compared in the HCl/HNO₃ (acid) residues of seven antarctic UOCs with those of equilibrated ordinary chondrites (EOCs). REE parameters designed to characterize the abundance pattern of REEs—normalized La abundance, normalized La/Lu abundance ratio and the degree of Eu anomaly—were highly variable in the acid residues of UOCs, suggesting that REEs were redistributed on UOC parent bodies. In contrast, the REE parameters are fairly constant in the acid residues of EOCs, suggesting that REE distribution attained equilibrium on EOC parent bodies. The REE parameters for the acid residues of UOCs are poorly correlated with the In, Zn and Se contents in the whole rock samples analyzed in this study, but appear to correlate with carbon content. This implies that REE parameters can be used as indices for the subclassification of UOCs. From the viewpoint of REE distribution, ALH77011 (and its paired ALH 78038) appears to be one of the least metamorphosed UOCs. (Auth.)

E-49314

Sandford, S.A., **Mid-infrared transmission spectra of antarctic ureilites, *Meteoritics*, Sep. 1993 28(4), p.579-585, 45 refs.**

The mid-infrared transmission spectra of 7 antarctic ureilites and 10 antarctic H-5 ordinary chondrites are presented. The ureilite spectra show a number of absorption bands, the strongest of which is a wide, complex feature due to Si-O stretching vibrations in silicates. The profiles and positions of the substructure in this feature indicate that Mg-rich olivines and pyroxenes are the main silicates responsible. The relative abundances of these two minerals show substantial variation from meteorite to meteorite, but generally indicate olivine as the most abundant. Both the predominance of olivine and the variable olivine-to-pyroxene ratio are consistent with the known composition and heterogeneity of ureilites. The H-5 ordinary chondrites spanned a range of weathering classes and were used to provide a means of addressing the extent to which the ureilite spectra may have been altered by weathering processes. While weathering of these meteorites produces some weak bands, the profile of the main silicate feature has been little affected by antarctic exposure in the meteorites studied here. The mid-infrared ureilite spectra provide an additional means of testing potential asteroidal parent bodies for the ureilites, particularly the subset of S-type asteroids having low albedos and weak absorption features in the near infrared. (Auth. mod.)

E-49315

Zreda-Gostynska, G., Kyle, P.R., Finnegan, D.L., **Chlorine, fluorine, and sulfur emissions from Mount Erebus, Antarctica and estimated contributions to the antarctic atmosphere**, *Geophysical research letters*, Sep. 15, 1993 20(18), p.1959-1962, 21 refs.

The discharge rates of halogens in aerosols and gases emitted from Mt. Erebus between Dec. 1986 and Jan. 1991 were estimated by combining element-to-sulfur ratios on filter samples with SO₂ output measured by COSPEC. The halogen and sulfur content of the gas vary in a quasi-cyclical pattern, possibly because of a heterogeneous distribution of volatiles in the Erebus magmatic system. The emission rates of HF and HCl have increased twofold since 1986, reaching 6 and 13.3 Gg/yr respectively in 1991, making Erebus an important contributor of halogens to the antarctic atmosphere. (Auth.)

E-49441

Philippe, M., Barale, G., Torres, T., Covacevich, V., **First study of *in situ* fossil woods from the Upper Cretaceous of Livingston Island, South Shetland Islands, Antarctica: palaeoecological investigations**, *Académie des sciences, Paris. Comptes rendus. Série II*, July 8, 1993 317(1), p.103-108, 18 refs.

In situ fossil woods of the Upper Cretaceous of Livingston I. are investigated for the first time. They give evidence of an open mixed type forest and for a climatic gradient through the Antarctic Peninsula at that time. (Auth.)

E-49442

Kamenev, E., **Soviet geological maps of the Prince Charles Mountains, East Antarctic Shield**, *Australian journal of earth sciences*, Oct. 1993 40(5), p.501-517, 16 refs.

Except for a map of Else Platform, the maps published in this paper represent all maps completed by the 28th and 35th Soviet antarctic expeditions in the Prince Charles Mountains. The maps cover 4 suggested tectonic provinces: the Beaver Belt, Lambert Province, Fisher Belt and Ruker Terrane. The 4 terranes show a continuous increase in metamorphic grade from south to north. The Ruker Terrane is of a greenschist and lower amphibolite facies metamorphic grade; the Lambert Province consists of retrogressively metamorphosed Beaver Belt granulite and prograde metamorphosed greenschist of the Ruker Terrane; and the Beaver Belt consists of high-grade granulite. The Fisher Belt is a greenstone belt which is interpreted to be thrust later against the Lambert Province. Rock types of all 4 terranes as shown on the maps are discussed, and an up-to-date summary of the work completed by the Soviet antarctic expeditions in the Prince Charles Mountains is given. (Auth. mod.)

E-49453

Zhu, C., Cui, Z.J., Xiong, H.G., Yao, Z., **Characteristics of the permafrost structure on the Fildes Peninsula, King George Island, Antarctica**, *Science in China*, Aug. 1993 36(8), p.997-1010, 11 refs.

Based on data from geoelectrical prospectings, temperature measuring, and divided layers frost-heaving instruments, this paper discusses the structural features of active layers in the Fildes Peninsula region and proves the presence of a bowl-shaped frost table in the stone circles area. Also discussed are different features of permafrost structure and their influence on the periglacial landform development between high and low places. It is suggested that a four-layer structure should exist in the permafrost region (including under-bedrock); that is, active layer, frost sand and gravels layer, frost volcanic rock permeated by sea water, and frost volcanic rock unpermeated by sea water. Finally, the permafrost table and its vertical gradient are deduced. (Auth. mod.)

E-49467

Ishizuka, H., **Explanatory text of geological map of Bergersenfjella, Sør Rondane Mountains, Antarctica**, Tokyo. *National Institute of Polar Research. Antarctic geological map series*, Mar. 1993 Sheet 33, 10p. + 5 plates + maps, Refs. p.8-10.

A geological map of Mount Bergersen is presented on a 1:100,000 scale, with one location diagram and marking of moraines and petrological and geochronological data. The general geology of the area, and the metamorphic and plutonic rocks and their evolution, are discussed in the accompanying text. Chemical analyses of the rocks are tabulated.

E-49490

Benoit, P.H., Sears, D.W.G., **Breakup and structure of an *H*-chondrite parent body: the *H*-chondrite flux over the last million years**, *Icarus*, Feb. 1993 101(2), p.188-200, Refs. p.199-200.

Induced thermoluminescence (TL) measurements have identified a subset of antarctic *H* chondrites which have significantly higher induced TL peak temperatures than other antarctic *H* chondrites or modern falls. This group was not produced by weathering or shock, but appears to have been produced by differences in thermal history. The group also consists of meteorites with about 8 Myr cosmic ray exposure ages and relatively large He-3/Ne-22 and Ne-21/Ne-22 ratios suggestive of small degrees of shielding compared to other antarctic and non-antarctic *H*-chondrites. Metallographic cooling rate determinations confirm the unusual thermal history of this subset, *H5* chondrites in this subset having cooling rates of about 100 C/Myr, compared to about 10-20 C/Myr for other *H5* chondrites. Thermoluminescence data from meteorites from 6 antarctic collection sites indicate that this subset dominated the *H*-chondrite flux some 300,000 years ago, but ceased to be represented in the flux 20,000 years ago. The generally smaller size of these meteoroid bodies may have allowed them to evolve more rapidly to Earth-crossing orbits but also resulted in their rapid destruction in space. The data show that the *H*-chondrite flux has changed over a relatively short period of time in terms of average meteoroid size and thermal history. (Auth. mod.)

See also:

B-47505 B-47644 B-47658 B-47704 B-47884 B-47888 B-47897
B-47933 B-48010 B-48118 B-48173 B-48178 B-48204 B-48207
B-48208 B-48246 B-48335 B-48361 B-48364 B-48606 B-48629
B-48644 B-48669 B-48715 B-48748 B-48749 B-48753 B-48795
B-48857 B-48920 B-49251 B-49293 B-49321 B-49322 B-49433
C-48873 C-48874 D-47816 F-47547 F-47771 F-47996 F-47998
F-48109 F-48124 F-48129 F-48533 F-48636 F-48637 F-48725
F-49025 F-49188 F-49190 F-49424 I-47440 I-47441 I-47689
I-47892 I-47893 I-47931 I-48265 I-48284 I-48348 I-48906
I-49361 I-49494 J-47751 J-47752 J-47756 J-47757 J-47764
J-47765 J-47766 J-47767 J-47768 J-47769 J-47770 J-48026
J-48030 J-48092 J-48154 J-48468 J-48472 J-48844 J-49086
J-49292 J-49312 J-49487 J-49488 L-47487 L-47488 L-47668
L-47742 L-47837 L-48035 L-48366 L-48523 L-48717 L-48724
L-49061 L-49246 L-49360

F. ICE AND SNOW

F-47382

Baškova, I.M., **Variations of sea ice area and thickness in the southern ocean due to climate warming**, *Soviet meteorology and hydrology*, 1991 No.5, p.41-45, Translated from *Meteorologiya i gidrologiya*. 18 refs.

Variations in the monthly mean thickness and area of sea ice cover in the antarctic region of the southern ocean due to climate warming are determined at the points of a geographic grid, with 1-5 deg latitudinal and 5 deg longitudinal steps. The layer of growing sea ice in the cold season is determined by Zubov's method; that of melting ice in summer months by the method of Budyko. The calculations are made using Strokina's data on radiation balance at the ocean surface. The monthly mean patterns of the ice cover area are presented for modern conditions and also account for a possible 3 C increase in planetary mean air temperature. The analysis is also compared to other studies. (Auth. mod.)

F-47439

Tsang, L., **Inversion of snow parameters from passive microwave remote sensing measurements by a neural network trained with a multiple scattering model**, *IEEE transactions on geoscience and remote sensing*, Sep. 1992 30(5), p.1015-1024, 28 refs. For another version see 46-4261.

The inversion of snow parameters from passive microwave remote sensing measurements is performed with a neural network trained with a dense media multiple scattering model. The basic idea is to use the input-output pairs generated by the scattering model to train the neural network. Once the neural network is trained, it can invert snow parameters speedily from the measurements. This paper describes the simultaneous inversion of three parameters: mean-grain size of ice particles in snow, snow density, and snow temperature from five brightness temperatures. It is shown that the neural network gives good results for the inversion of parameters from the simulated data, for which the absolute percentage errors for mean-grain size of ice particles and snow density are less than 10% and the absolute error for snow temperature is less than 3 K. The neural network with the trained weighting coefficients of the three-parameter model is used to invert the SSMI data over the antarctic region. The algorithm inverts 30,000 sets of 5-channel brightness temperatures of Antarctica in only 10 cpu min on a VAX 3500 workstation. Validity of the inversion results is discussed in view of the limited number of parameters used and the much more complicated real-life situation in Antarctica. (Auth. mod.)

F-47443

Raynaud, D., **Glacial-interglacial evolution of greenhouse gases as inferred from ice core analysis: a review of recent results**, *Quaternary science reviews*, June 1992 11(4), p.381-386, 27 refs.

Ice core analysis provides the most direct evidence of changes in some major greenhouse gases (CO₂, CH₄ and N₂O) over the climatic cycle covering approximately the last 150,000 years. A remarkable overall correlation is observed between the CO₂ or CH₄ record and the climatic changes in the high latitudes of the Southern Hemisphere, with lowest greenhouse gas concentrations found under full glacial conditions. In terms of phase relationship, CO₂ and CH₄ are roughly in phase with the climatic signal during the deglaciation periods; when entering the glaciation, CH₄ appears to decrease in phase with the antarctic cooling, but CO₂ lags strikingly behind. The CH₄ re-

cord exhibits a marked signal which is most likely associated with the abrupt cooling of the Younger Dryas. Existing differences between CO₂ and CH₄ records in comparison with climate reflect differences in sources which are mainly oceanic in the case of CO₂ and continental in the case of CH₄. For N₂O only few data are available, suggesting that the N₂O concentrations may also have been lower during the Last Glacial Maximum than during the Holocene. Greenhouse gases are likely to have played an important climatic role in amplifying, together with continental ice, the initial orbital forcing of the glacial-interglacial climatic changes. (Auth.)

F-47514

Jacobs, S.S., Hellmer, H.H., Doake, C.S.M., Jenkins, A., Frolich, R.M., **Melting of ice shelves and the mass balance of Antarctica**, *Journal of glaciology*, 1992 38(130), p.375-387, Refs. p.384-387.

This paper presents a calculation of the present ice budget for Antarctica from measurements of accumulation minus iceberg calving, run-off and in situ melting beneath the floating ice shelves. The resulting negative mass balance of 469 Gt/yr differs substantially from other recent estimates, but some components are subject to high temporal variability and budget uncertainties of 20-50%. Annual accumulation from an earlier review is adjusted to include the Antarctic Peninsula for a total of 2144 Gt/yr. An iceberg production rate of 2016 Gt/yr is obtained from the volume of large icebergs calculated from satellite images since 1978, and from the results of an international iceberg census project. Ice-shelf melting of 544 Gt/yr is derived from physical and geochemical observations of meltwater outflow, glaciological field studies and modeling of the sub-ice ocean circulation. The highest melt rates occur near ice fronts and deep within sub-ice cavities. Run-off from the ice-sheet surface and from beneath the grounded ice is taken to be 53 Gt/yr. Less than half of the negative mass balance need come from the grounded ice to account for the unattributed 0.45 mm/yr in the Intergovernmental Panel on Climate Change "best estimate" of the recent global sea-level rise. (Auth. mod.)

F-47546

Lal, D., Jull, A.J.T., **Cosmogenic nuclides in ice sheets**, *Radiocarbon*, 1992 34(2), International Radiocarbon Conference, 14th, Tucson, AZ, May, 1991. Proceedings. Workshop on paleoastrophysics and natural variations of cosmogenic isotopes. Edited by A. Long et al, p.227-233, 36 refs.

This paper examines the nature of the twofold record of cosmogenic nuclides in ice sheets, of nuclei produced in the atmosphere, and of nuclei produced *in situ* due to interactions of cosmic-ray particles with oxygen nuclei in ice. It is shown that a wealth of geophysical information, in principle, can be derived from a suitable combination of nuclides in ice deposited at different latitudes, including temporal changes in the cosmic-ray flux, in the geomagnetic field and in climate. The rate of deposition of cosmogenic atmospheric nuclei in ice depends on the global cosmic-ray flux and a host of climatic factors. The global cosmic-ray flux, in turn, depends on the level of solar activity, and of the geomagnetic dipole field. Thus, the task of deconvolution of the record of cosmogenic nuclides can be facilitated by considering the recently discovered record of *in situ* produced cosmogenic C-14, whose production rate at high latitudes is independent of the geomagnetic dipole field. A brief review of work done to date and new prospects for deciphering geophysical records using ice sheets is also presented. (Auth. mod.)

F-47547

Sonett, C.P., **Supernova shock ensemble model using Vostok Be-10 radioactivity**, *Radiocarbon*, 1992 34(2), International Radiocarbon Conference, 14th, Tucson, AZ, May, 1991. Proceedings. Workshop on paleoastrophysics and natural variations of cosmogenic isotopes. Edited by A. Long et al, p.239-245, 37 refs.

Analysis of the Vostok ice-core record of Be-10 suggests that the sharply resolved increases in Be-10 at 35 ka and 60 ka are due to cosmic-ray (CR) increases. As an alternate to long-term solar modulation or strong decreases in the Earth's magnetic field, supernova (SN) forcing is qualitatively consistent with the generation of a forward-reverse shock ensemble from a spherical blast wave of age very approximately at 75 ka. Confirmation would be the first geochemical detection of supernova forcing of spallogenic and perhaps cosmogenic isotope production in the atmosphere. One contemporary model requires the solar system to be immersed in the 'bubble' of the earlier post-SN evolution, possibly affecting estimates of heliospheric boundary distance. However, more recent analysis of Camp Century ice core data discloses only the 35 ka Be-10 peak. This recent result compounds the difficulty of constructing a completely consistent model for the source of the Vostok spikes. This paper is written in the spirit of suggesting only one of possibly several different models, even within the subclass of SN models. (Auth. mod.)

F-47579

Vaughan, D.G., **Chasing the rogue icebergs**, *New scientist*, Jan. 9, 1993 137(1855), p.24-27.

Some thoughts are presented on the saga of A24, a king size iceberg which broke away from the Filchner Ice Shelf in 1986. It began to drift from the shelf, grounded, broke free again, and floated out to sea where it began moving to the beat of the deeper ocean currents. It has continued northeastward into the South Atlantic, passing well eastward of the Falklands and west of South Georgia. Unconfirmed sighting reports place A24 as far north as 36S, about the same latitude as Buenos Aires. Apparently a deep crevasse developed in the Filchner Ice Shelf which eventually weakened enough to let A24 drop off. Also discussed as an adjunct of this calving process are the uncertainties in the interpretation of a global warming trend vis à vis the antarctic ice shelves. Different researchers, using the same data, have reached opposing conclusions: global warming will cause either greater melting, allowing more ice shelves to break up bringing on a considerable rise in sea level, or it will cause increased precipitation and the enlargement of glaciers and ice sheets. There is equal uncertainty as to whether the ice mass balance is positive or negative, and thus, whether the ice sheets are growing or shrinking.

F-47588

Darovskikh, A.N., **Polarization characteristics of natural thermal emission from antarctic sea ice** [Polarizatsionnye kharakteristiki sobstvennogo teplovogo izlucheniia morskogo antarkticheskogo l'da], *Sovetskaiia antarkticheskaiia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.32-35, In Russian. 2 refs.

Experimental investigations carried out on board the *Akademik Fedorov* from Oct. 1987 to June 1988 resulted in the determination of 6 polarization characteristics of radiothermal emission from sea ice, which are described. Also described are the main technical characteristics of the radiometric station Omega-S5 and the methods used in the investigation.

F-47656

Kotliakov, V.M., **Glaciological mapping and global seasonal snow storage**, *Polar geography and geology*, Apr.-June 1992 16(2), p.123-147, 18 refs. For Russian original see 47-315 or 20F-46990.

The areas and volumes (in water equivalent) of seasonal snow cover in 10 sublatitudinal glaciological zones have been calculated from the maps of snow and ice storage in the *World Atlas of Snow and Ice Resources*. These zones are combined into five glaciological belts, subdivided by sublongitudinal boundaries into 36 glaciological provinces, including both Northern and Southern Hemispheres. (Auth. mod.)

F-47657

Loktionova, E.M., **Large-scale characteristics of the global distribution of snow cover**, *Polar geography and geology*, Apr.-June 1992 16(2), p.148-159, 14 refs. For Russian original see 47-316 or 20F-46991.

This paper presents a scheme for regionalization of the world's snow cover on the basis of latitudinal belts. Such parameters as snow storage and duration of snow cover (with an analysis of variations in these parameters) are examined for each belt and for subdivisions within the belts. The patterns that emerge are placed in the context of controlling influences such as ocean currents and patterns of atmospheric circulation. (Auth.)

F-47678

Souchez, R., **Ice composition evidence of marine ice transfer along the bottom of a small antarctic ice shelf**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.503-506, Reprinted from *Geophysical Research Letters*, May 1991, 18(5), p.849-852. 21 refs.

The existence of marine ice transfer along the underside of the Hells Gate ice shelf (Victoria Land) is indicated by an isotopic and chemical study of ice cores. Because of top surface ablation, the marine ice formed at the ice shelf-ocean interface ultimately appears at the shelf surface. A succession of congelation, platelet and frazil ice is shown to occur. The combined study of stable isotope composition and of the sodium content of these different ice types proves to be a valuable tool for specifying the ice shelf-ocean interactions in this area. Two different freezing zones separated by a melting zone exist; the parent water for the frazil ice is meltwater from congelation ice which appears in the upstream zone. (Auth.)

F-47693

International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992, Triantafyllou, M.S., ed, Chung, J.S., ed, Karal, K., ed, Tunik, A.L., ed, **Proceedings. Vol.2**, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, 806p., Refs. passim. For selected papers see 47-1829 through 47-1879 or F-47695, F-47697, F-47699, F-47700, G-47694, G-47696 and G-47698.

This is a collection of 450 papers, 7 of which are pertinent to Antarctica, presented at the 2nd International Offshore and Polar Engineering Conference (ISOPE-92) held in San Francisco, June 14-19, 1992. Recent international developments and a review of frontier technologies are covered, including global offshore and Arctic petroleum/technology, polar (Arctic and Antarctic) technology, ice technology, atmospheric icing, gas hydrates, ocean energy, geotechnical engineering, superconductivity applications and other emerging topics.

F-47695

Brune, E., **Safety in ice navigation in antarctic waters**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.571-576, 2 refs.

Too many serious accidents have happened in the pristine environment of the Antarctic due to the increase of shipping, lack of proper ice seamanship and/or operating the wrong vessel at the wrong time in the wrong area of the Antarctic. This paper will focus upon the regulations of the classification companies, the various areas of Antarctica regarding distribution of sea ice, and the possibility of using 'near-real time' ice charts with ice routing. (Auth.)

F-47697

Kwok, K.C.S., Smedley, D.J., Kim, D.H., **Snowdrift around antarctic building—effects of corner geometry and wind incidence**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.587-591, 12 refs.

Modelling of antarctic snowdrifting was conducted in a turbulent boundary layer wind tunnel. A series of 7 models was designed, based on extended dimensions of a shipping container. Tests were carried out to investigate the effects of varying the model corner geometry and the angle of wind incidence on snowdrift formation. The results were used to formulate design guidelines for buildings in Antarctica. (Auth.)

F-47699

Borodkin, V.A., Gavrilov, V.P., Kovalev, S.M., Lebedev, G.A., **Influence of structural anisotropy of sea ice on its mechanical and electrical properties**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.670-674, 15 refs.

Experimental investigations for the determination of the tensile strength in pressing-on samples of one-year old sea ice cover 90 cm thick are reported. The upper layer, from 0 to 40 cm, consisted of small granular ice types V7, V8; the lower layer, from 80 to 90 cm, consisted of ice type V6. Strength determination at one-axis pressing of ice samples was done on a hydraulic press. It is concluded that oriented sea ice crystal structures occur in most regions of the Arctic and Antarctic. The mechanical properties of such ice depend on the direction of loading, which can be important for navigation in ice-covered regions. A correlation is found between the crystalline structure, mechanical and electrical properties of ice.

F-47700

Guichard, A., Engler, M., Klein, K., Fauquemberg, P., **Methodology for full-scale iceberg impact experiments in the Antarctic**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.718-723, 12 refs.

The methodology used in conducting full scale iceberg impact experiments in two antarctic campaigns is discussed. It involves

measurement of iceberg dimensions, iceberg motions, and contact area with a rocky cliff. (Auth.)

F-47701

Gaull, B.A., Adamson, D.A., Pickard, J., **Seismicity associated with icebergs calving from glaciers near Mawson, East Antarctica**, *Australian Journal of Earth Sciences*, 1992 Vol.39, p.473-480, 19 refs.

Icebergs produced from the termini of non-floating or partly floating outlet glaciers at the seaward margin of the antarctic ice sheet near Mawson were photographed and measured. Seismic records at Mawson are interpreted in terms of catastrophic calving of these icebergs from ice cliffs into the sea to produce low frequency seismic signals of varying amplitude and duration. It is shown how parameters of foreshocks to these ice falls could have been used to predict the approximate time and location of one of the falls. These data were compared with those from other icequake and earthquake studies. Further studies of this type are expected to reveal a greater understanding of ice dynamics and to assist with estimation of the mass of ice leaving Antarctica and of ice fall prediction, which has immediate ramifications for safety of base personnel. (Auth. mod.)

F-47706

Stössel, A., **Sensitivity of southern ocean sea-ice simulations to different atmospheric forcing algorithms**, *Tellus*, Oct. 1992 44A(5), p.395-413, 45 refs.

Sea ice is sensitively dependent on the fluxes of energy, mass and momentum between the ocean and the atmosphere, making it worth investigating the modification of these fluxes by the respective boundary layers. Atmospheric forcing in the present investigation is changed from monthly observational data, to daily modelled values computed by an operational numerical weather-prediction model. Applying these computations directly, as atmospheric surface forcing to the sea ice-oceanic mixed-layer model, yields encouraging results, indicating the general reliability of these data. Fluxes derived from the atmospheric forcing are modified in a first step to include the stability dependency of the atmospheric surface layer. Compared to the application of usual adjustment practices, this leads to improved results, especially with respect to the ice velocities in divergent ice fields. In the next step, the atmospheric forcing level is raised to the geostrophic level, thus incorporating the entire atmospheric boundary layer. While the forcing fields become less dependent on the prescribed boundary conditions of the weather-prediction model, the simulations appear to be reasonable only when the near-surface wind forcing is applied, the overall roughness length is increased and the large-scale stability is reduced. This leads to important implications for coupled atmosphere-sea ice-ocean models. (Auth.)

F-47718

Frolich, R.M., **How unstable is the west antarctic ice sheet**, *Physics world*, Nov. 1992 5(11), p.21-22, 1 ref.

The author critiques a numerical model developed by D. MacAyeal which incorporates the interaction of a glacier with its bed to predict glacier movement. The critique rests on these major points. The MacAyeal model restricts the modelling to where the ice sheet bed is far below sea level and drainage is almost entirely through ice streams, and cannot resolve ice streams individually. The model requires 50,000 years to reach a steady state, and when it uses simplified surface-temperature and sea level variations through ten glacial cycles, the model ice sheet never reaches a steady state and completely collapses. MacAyeal's new claim is that the potential for collapse depends on the present distribution of sub-glacial till which is itself poorly known. For the MacAyeal paper being critiqued see 47-352 (20F-47003).

F-47719

Davidson, G., **Icy prospects for a warmer world**, *New scientist*, Aug. 8, 1992 No.1833, p.23-26.

The processes involved with ice sheets growing and ablating as global warming occurs are reviewed; the physical processes attending, and models used to predict, sea level rises are examined; and the pros and cons of possible rapid sea level rises are considered. It is concluded that rapid sea level rises are unlikely but that if temperatures increase by more than 5C the melting of ice sheets in both polar regions would occur and sea level rises would inevitably follow.

F-47734

Raynaud, D., **Ice record of greenhouse gases**, *Science*, Feb. 12, 1993 259(5097), p.926-934, Numerous refs.

Gases trapped in polar ice provide the most direct record of the changes in greenhouse gas levels during the past 150,000 years. The best documented trace-gas records are for CO₂ and CH₄. Measurements corresponding to the industrial period document the recent changes in growth rate. The variability observed over the last 1000 years constrains the possible feedbacks of a climate change on the trace gases under similar conditions as exist today. Changes in the levels of greenhouse gases during the glacial-interglacial cycle overall are found to parallel, at least at high southern latitudes, changes in temperature; this relation suggests that greenhouse gases play an important role as an amplifier of the initial orbital forcing of Earth's climate, and also helps to assess the feedbacks on the biogeochemical cycles in a climate system in which the components are changing at different rates. (Auth.)

F-47739

Sundquist, E.T., **Global carbon dioxide budget**, *Science*, Feb. 12, 1993 259(5097), p.934-941, Numerous refs.

The increase in atmospheric CO₂ levels during the last deglaciation was comparable in magnitude to the recent historical increase. However, global CO₂ budgets for these changes reflect fundamental differences in rates and in source and sinks. The modern oceans are a rapid net CO₂ sink, whereas the oceans were a gradual source during the deglaciation. Unidentified terrestrial CO₂ sinks are important uncertainties in both the deglacial and recent CO₂ budgets. The deglacial CO₂ budget represents a complexity of long-term dynamic behavior that is not adequately addressed by current models used to forecast future atmospheric CO₂ levels. (Auth.)

F-47771

Ishman, S.E., Rieck, H.J., **Late Neogene antarctic glacio-eustatic record, Victoria Land Basin margin, Antarctica**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.327-347, Refs. p.344-347.

Glaciomarine and marine sediments recovered at Dry Valley Drilling Project (DVDP) sites 10 and 11 represent the most complete Miocene and Pliocene (6 Ma to 2.8 Ma) sequence to date from the antarctic continent. These cores document changing glacial and sea level conditions in the Victoria Land Basin throughout much of the late Neogene. Widely fluctuating bathymetries and environmental conditions indicated from benthic foraminifer and diatom distributions provide a detailed and well-constrained late Neogene sea level and glacial history of the antarctic region. The timing of these eustatic fluctuations, and the fluctuations in glacial/nonglacial conditions in the Taylor Valley region of the Victoria Land Basin throughout the late Neogene, significantly affect the interpretations of ice volume history of Antarctica. The paleoenvironmental record from DVDP 10 and 11 provides evidence for an unstable Late Neogene East Antarctic Ice Sheet and its influence on global sea level. (Auth. mod.)

F-47774

Kottmeier, C., Olf, J., Frieden, W., Roth, R., **Wind forcing and ice motion in the Weddell Sea region**, *Journal of geophysical research*, Dec. 20, 1992 97(D18), p.20,373-20,383, 24 refs.

This paper relates to data from seven buoys, which were deployed for 14 months beginning in Oct. 1986 on ice floes in the southeastern Weddell Sea. The buoys were equipped with air pressure and temperature sensors, propeller anemometers for wind speed and direction measurements (five buoys) and a current meter (one buoy). The data transmission and buoy tracking were achieved with the aid of the Argos satellite system. The data are used to correlate seasonal variations in ice drift velocity to wind forcing. (Auth. mod.)

F-47780

Boutron, C.F., Görlach, U., **Occurrence of heavy metals in antarctic and Greenland ancient ice and recent snow**, NATO Advanced Study Institute on Metal Speciation in the Environment, Cesme, Turkey, Oct. 9-20, 1989. Proceedings. Edited by J.A.C. Broekaert et al, NATO Advanced Science Institutes, Series G. Ecological Sciences. Vol.23, Berlin, Springer-Verlag, 1990, p.137-151, 32 refs.

DLC TD196.M4 N37 1989

This review suggests that current understanding of the occurrence of heavy metals in antarctic and Greenland ancient ice and recent snow is still limited, although a high quality but still incomplete data set is now available for lead. Data on the speciation of heavy metals are presently not available for Antarctica and Greenland. (Auth. mod.)

F-47781

Peel, D.A., **Ice core evidence from the Antarctic Peninsula region**, *Climate since A.D. 1500*. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.549-571, 38 refs.

Ice core records from the Gomez Site on the southern Palmer Land plateau (spanning the years 1942-1980), Dolleman I. (1795-1986), James Ross I. (1850-1980), and Orcadas Station in the South Orkney Is. (1903-present), are compared. Except for Orcadas which is strongly moderated by the surrounding ocean, all the records indicate an overall increasing temperature trend (0.07 C/yr) and an increasing snow accumulation rate (by about 20%) since 1955. A strong positive isotope anomaly and deuterium excess in the records for 1933-38 and 1973-77 may have been caused by the development of a large polynya in the Weddell Sea.

F-47782

Mosley-Thompson, E., **Paleoenvironmental conditions in Antarctica since A.D. 1500: ice core evidence**, *Climate since A.D. 1500*. Edited by R.S. Bradley and P.D. Jones, London, Routledge, 1992, p.572-591, 40 refs.

Ice core records for the last 500 years from the East and West Antarctic Ice Sheets are synthesized, mostly from the Siple and Amundsen-Scott South Pole stations. The records of $\delta^{18}O$ and dust concentrations from Siple suggest warmer and less dusty atmospheric conditions from 1600 to 1830 (which occurred during much of the period from about 1500-1880 corresponding with the Little Ice Age in the Northern Hemisphere), while the records from South Pole indicate that opposite conditions, that is, cooler and more dusty, were prevalent over the East Antarctica Plateau during the same period. There may have been a slight cooling trend in the sector between 40E and 30W and a slight warming trend for the rest of Antarctica and the Antarctic Peninsula from 1945 to 1985, but there is insufficient evidence to indicate any consistent trend over all of Antarctica.

F-47796

Cini, R., **Transport of marine organic matter evidenced in antarctic snow**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.191-204, 25 refs.

The presence of marine aerosol in antarctic snow and its transport conditions are discussed. Results of some physico-chemical parameters relating to the process of marine aerosol formation are reported for two snow samples of different characteristics. Fluorescent surfactant matter in both samples is evidenced. Further UV photolysis on marine water after a laboratory aerosolization process seems to confirm the exclusive marine origin of organic matter for snow sampled at 1130 m altitude on Mt. Melbourne. (Auth.)

F-47834

Sievers, J., Redfield, T., Delisle, G., **Radio-echo-sounding on Browning Pass, Terra Nova Bay area, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.135-137.

Browning Pass is a 17.5 km long by about 3 km wide NE-SW running valley that forms an easy access route from Campbell Glacier to Priestley Glacier and the Nansen Ice Shelf. Because of its smooth snow surface, Browning Pass has served in the past as a landing site for Hercules as well as smaller aircraft. An attempt was made to determine the snow and ice thickness along several radio-echo sounding (RES) profiles across Browning Pass. Values around 100 m were measured in the NE part and of 50 m or less in the SW part. The high moisture content of the snow in the SW part of the investigated area, however, might have prevented the radar signals from measuring the true depth of bedrock. Arguments are presented which nevertheless suggest a shallow snow and ice cover in Browning Pass.

F-47844

Moore, J.C., Paren, J.G., Oerter, H., **Sea salt dependent electrical conduction in polar ice**, *Journal of geophysical research*, Dec. 10, 1992 97(B13), p.19,803-19,812, 41 refs.

A 45 m length of ice core from Dolleman I., Antarctic Peninsula has been dielectrically analyzed at 5 cm resolution using the dielectric profiling (DEP) technique. The core has also been chemically analyzed for major ionic impurities. A statistical analysis of the measurements shows that the LF (low frequency) conductivity is determined both by neutral salt and acid concentrations. Salts (probably dispersed throughout the ice fabric) determine the dielectric conductivity. The salt conduction mechanism is probably due to Bjerrum L defects alone, created by the incorporation of chloride ions in the lattice. Samples of ice from beneath the Filchner-Ronne Ice Shelf were also measured, and display a similar conduction mechanism below a solubility limit of about 400 micromoles of chloride. The temperature dependence of the neutral salt, acid and pure ice contributions to the LF conductivity of natural ice between -70 C and 0 C is discussed. These results allow a comprehensive comparison of dielectric and chemical data from natural ice. (Auth. mod.)

F-47877

Priscu, J.C., **Variation in light attenuation by the permanent ice cap of Lake Bonney during spring and summer**, *Antarctic journal of the United States*, 1991 26(5), p.223-224, 2 refs.

This article presents quantitative data on changes in ice opacity of the ice cap on the east lobe of Lake Bonney during the 1989-1990 austral summer. Integrated daily incident and underwater irradiance (immediately beneath the ice) between Nov. 16, 1989 and Jan. 20, 1990 are shown in a figure. Incident irradiance gradually increased until mid-Dec. and then decreased, whereas underwater irradiance declined sharply during the first week in Dec. and remained relatively constant to the end of the study period. The variability in underwater

light transmission caused by the permanent ice cap of Lake Bonney can influence the photophysiology of phytoplankton existing in the water column.

F-47886

Alley, R.B., **Ice sheets and climate**, *Earth and mineral sciences*, 1989 58(3), p.41-45, 4 refs.

Sea levels have fluctuated over the last hundreds of thousands of years largely because of changes in the volume of major ice sheets. Currently, sea level is rising slowly because of thermal expansion of the oceans and the melting of mountain glaciers. Greenhouse warming in the future can be expected to accelerate mountain glacier melting and begin melting the Greenland ice sheet, but it will also remove some water from the oceans through increased snowfall in Antarctica. The net result would be slow or zero sea-level rise over the next century or longer. However, dramatic sea level rise would occur if the greenhouse warming trend destabilized the marine West Antarctic ice sheet. Such an event would result in tremendous economic dislocation and the potential for human disaster. Studies to date have discovered new feedback mechanisms that tend to stabilize the ice sheet, but much work remains to be accomplished before confident predictions can be made.

F-47904

Jeffries, M.O., Weeks, W.F., **Structural characteristics and development of sea ice in the western Ross Sea, Antarctica**, *Science*, Mar. 1993 5(1), p.63-75, 34 refs.

The internal structure of ice cores from western Ross Sea pack ice floes showed considerable diversity. Snow-ice formation made a small but significant contribution to ice growth. Frazil ice was common, and its growth clearly occurred during both the pancake cycle and deformation events. Congelation ice was also common, in both its crystallographically aligned and non-aligned varieties. Platelet ice was found in only one core next to the Drygalski Ice Tongue, an observation adding to the increasing evidence that this unusual ice type occurs primarily in coastal pack ice near ice tongues and ice shelves. The diverse internal structure of the floes indicates that sea ice development in the Ross Sea is as complex as that in the Weddell Sea and more complex than in the Arctic. The mean ice thickness at the ice core sites varied between 0.71 m and 1.52 m. The thinnest ice generally occurred in the outer pack ice zone. Regardless of latitude, the ice thickness data are further evidence that antarctic sea ice is thinner than arctic sea ice. (Auth.)

F-47938

Hellmer, H.H., Jacobs, S.S., **Ocean interactions with the base of Amery Ice Shelf, Antarctica**, *Journal of geophysical research*, Dec. 15, 1992 97(C12), p.20,305-20,317, 50 refs.

Using a two-dimensional ocean thermohaline circulation model, the authors varied the cavity shape beneath Amery Ice Shelf in an attempt to reproduce the 150 m-thick marine ice layer observed at the "G1" ice core site. Model results showed temperature/salinity gradients similar to observations from beneath other ice shelves where ice is melting into seawater. Modeled outflow characteristics at the ice front are in general agreement with oceanographic data from Prydz Bay. A freshwater flux across the grounding line, derived from melting beneath the grounded ice sheet, would have to be anomalously large to produce the basal marine ice layer and account for the Ice Shelf Water outflow. These results conform with Morgan's inference that the G1 core may have been taken in a basal crevasse filled with marine ice. This ice is formed from water cooled by ocean/ice shelf interactions along the interior ice shelf base. (Auth. mod.)

F-47939

Kipfstuhl, J., Dieckmann, G.S., Oerter, H., Hellmer, H.H., Graf, W., **Origin of green icebergs in Antarctica**, *Journal of geophysical research*, Dec. 15, 1992 97(C12), p.20,319-20,324, 30 refs.

A comparison of samples from a translucent green iceberg with a core from the Ronne Ice Shelf revealed an excellent agreement in isotopic composition, crystal structure, and incorporated sediment particles. Marine shelf ice which constitutes the basal portion of some ice shelves is considered to be the source of green icebergs. It most likely results from "ice pump" processes which produce large amounts of ice platelets in the water column beneath ice shelves. These subsequently accumulate and become compacted into bubble-free, desalinated ice. Iceberg and drift-buoy trajectories indicate that green icebergs observed in the Weddell Sea originate from the Amery Ice Shelf rather than from the Ronne Ice Shelf, although the latter ice shelf is also a potential source. (Auth.)

F-47945

Stössel, A., Claussen, M., **Interactive atmospheric surface-layer modifications for a large-scale sea-ice model**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.109-110, 9 refs.

In sea-ice regions the largest factors controlling the strength of the forcing or coupling between atmosphere and sea ice originate from the extremely heterogeneous horizontal distribution of static stability within the atmospheric surface layer (ASL) and the variations in surface roughness due to variable ice and snow thicknesses, deformations in form of pressure ridges and variable ice coverage. This has to be accounted for as the sea-ice component implemented in large-scale general circulation models (GCMs) becomes more and more sophisticated. One primary question is how to match the different scales of consideration in an appropriate way. The atmospheric forcing being established at a corresponding height, it appears to be reasonable to determine the ASL modifications of the dynamic forcing in terms of "large-scale" or "effective" ASL quantities. These are calculated as functions of the ice concentration, ice freeboard, snow thickness and the local boundary-layer quantities, representing the main issue of this paper. After a short description of the modifications of the ASL formulation due to its large-scale application over heterogeneous terrain, an example of its impact is presented.

F-47987

Nicholls, K.W., Paren, J.G., **Extending the antarctic meteorological record using ice-sheet temperature profiles**, *Journal of climate*, Jan. 1993 6(1), p.141-150, 22 refs.

Two vertical ice temperature profiles from locations in the Antarctic Peninsula unaffected by meltwater are presented. A simple time-dependent heat diffusion-advection model is used to infer broad surface temperature variations in the Antarctic Peninsula over the century prior to the start of local meteorological records. Air temperature records from two representative meteorological stations (Faraday and Halley) are used to determine the ice surface boundary conditions in the later stages of the model runs. Earlier temperature histories are then devised to provide best fits between the modeled and observed ice temperature profiles. Results of the modeling suggest that the surface temperature in the Antarctic Peninsula dropped by 1.6 deg +/- 0.2 C between the beginning of the nineteenth century and the start of the Faraday record in 1944. On time scales of several decades the Faraday air temperature record began during a period colder than the average, and temperatures in the early 1800s were probably very similar to those of today. (Auth. mod.)

F-47993

Bentley, C.R., Retzlaff, R.N., Lord, N., Novick, A.N., **Analysis of radar studies on the Siple Coast**, *Antarctic journal of the United States*, 1991 26(5), p.62-63, 4 refs.

Four papers describing different aspects of this project were presented at an American Geophysical Union meeting in Dec. 1990 and are summarized here. Referring to ice streams A,B,C, and D, broad topics of the papers were: bed deformation on the ice plain; detection of a large bottom crevasse on the ice plain of stream B, the crevasse being hyperbolic in shape, unsymmetrical, about 12 km long; surface and bed elevation mapping derived from 14,000 km of airborne radar soundings; and dating the shut down of ice stream C at 130 +/- 20 years ago.

F-47995

Alley, R.B., **Formation of ice-stream rafts by recrystallization**, *Antarctic journal of the United States*, 1991 26(5), p.66-67, 13 refs.

Key factors in ice streaming are basal lubrication and ice softness. Raft formation might be related to an irregular onset of basal lubrication, or to localized switches in ice softness. Field and theoretical studies recently have concentrated on basal lubrication of west antarctic ice streams, but not as much attention has been focused on ice softness. On the other hand, because the rafts are visible at the surface in ice 1,000 m thick, ice conditions almost certainly play a role in their formation, whether or not discontinuous basal lubrication is important. In parallel with other groups working in West Antarctica, first under the auspices of the Siple Coast Project and now as the West Antarctic Ice Sheet Initiative, theoretical studies have been started to learn how important the variations in ice softness might be and what studies might be done to characterize these variations.

F-47996

Richard, S.M., Luyendyk, B.P., **Glacial flow reorientation in the southwestern Fosdick Mountains, Ford Ranges, Marie Byrd Land**, *Antarctic journal of the United States*, 1991 26(5), p.67-69, 12 refs.

Examination of the glacial striations on the nunataks, clasts, and bedrock formations in the Fosdick Mountains region leads to the conclusion that the principal glacier flow direction in earlier times was from the southeast to the northwest, nearly perpendicular to the present direction of flow.

F-47997

Grootes, P.M., Steig, E.J., Massey, C., **"Taylor Ice-Dome" study: reconnaissance 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.69-71, 5 refs.

Taylor Dome is a small ice dome, center above 2,450 m at about 77.6S, 158E separated from a ridge of the main east antarctic ice sheet by a saddle at least 100 m lower. Flowline reconstruction shows this dome as a local center of outflow supplying ice to the glaciers entering the McMurdo Dry Valleys of southern Victoria Land from the west. Climatic changes have been recorded both in the ice accumulating on Taylor Dome and in the glacial geology in the McMurdo Dry Valleys. An ice core retrieved from Taylor Dome thus offers the opportunity to compare the ice-core record of past climatic and environmental changes from an area of simple ice flow with the directly related geological record of past glaciations in the adjacent McMurdo Dry Valleys. From Nov. 29, 1990 to Jan. 28, 1991, two field parties of three members each carried out a joint reconnaissance of Taylor Dome in preparation for the selection of an ice-core drill site.

F-47998

Waddington, E.D., Morse, D., Balise, M.J., Firestone, J., **Glacier geophysical studies for an ice core site at "Taylor Dome"**, *Antarctic journal of the United States*, 1991 26(5), p.71-73, 4 refs.

The program for Taylor Dome is arranged as a three-year effort culminating in the extraction of an ice core which, it is anticipated, will provide climate data for the immediate past 20,000 years. Preliminary steps and procedures contributing to site characterization were accomplished in 1990-1991: the setting up of an automatic weather station; the use of a strain net to establish surface topography; and the obtaining of bedrock topography by radar soundings.

F-47999

Kellogg, T.B., Kellogg, D.E., Stuiver, M., **Oxygen isotope data from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history**, *Antarctic journal of the United States*, 1991 26(5), p.73-76, 16 refs.

During the 1989-1990 field season ice was collected from beneath the debris cover for oxygen isotope analysis at 182 sites on McMurdo Ice Shelf. Isotope values range from -51.28 parts per thousand (ppt) to +5.0 ppt. Because the sites are widely distributed and encompass the range of values reported by other investigators, they probably demonstrate the full range of values typical for the McMurdo Ice Shelf. Most McMurdo Ice Shelf sites yield isotopic oxygen values of 0.0 ppt to +3.0 ppt. Because of fractionation, sea water should become slightly enriched in $\delta^{18}\text{O}$ relative to the international standard, SMOW (0.0 ppt), during freezing. Such slightly enriched values are therefore diagnostic for ice of pure marine origin; and they dominate throughout the McMurdo Ice Shelf from the end of Minna Bluff to the calving margin. The objective was to obtain ice free of local precipitation to determine the origin of McMurdo Ice Shelf ice. Given the high surface ablation rate, the resultant inversions of surface relief, and the abundance of melt ponds on the McMurdo Ice Shelf surface, it is not surprising that approximately 13% of ice samples represent admixtures of marine and fresh water. The fact that this figure is not larger demonstrates the dominance of basal freezing on the mass balance of the McMurdo Ice Shelf, and suggests that most snow falling in the ablation area blows out to sea, sublimates, or melts and flows down cracks or off the front of the McMurdo Ice Shelf.

F-48004

Fori, G., Buchanan, D., Schutt, J., **Annual ablation rates of the Lewis Cliff ice tongue**, *Antarctic journal of the United States*, 1991 26(5), p.86-87, 2 refs.

The annual ablation rates of ice in the Lewis Cliff ice tongue were measured on Dec. 7, 1990 using 21 bamboo poles planted in the ice in Jan. 2, 1988. The ablation rates were determined by measuring the lowering of the ice surface at each locality relative to a notch that had been cut into each pole to mark the level of the ice surface at the time of implantation. The lowering of the ice surface was measured with calipers that have a reading error of only 0.00254 cm. The annual ablation rates across the upper Lewis Cliff ice tongue based on six of the seven stations range from 3.4 to 5.6 cm/yr with an average of 4.4 cm/yr. The results derived from the stations across the lower Lewis Cliff ice tongue suggest that the annual ablation rates at this location increase from east, (4.7 cm/yr, 18-7) to west (9.3 cm/yr, 18-1). The increase in the average ablation rate coincides with higher wind speeds along the western side of the ice tongue, but might also reflect the proximity of Mount Acheron, which may cause local warming. The average annual ablation rate of all eight stations along the lower crossline is 5.8 cm/yr.

F-48005

Saltzman, E.S., **Methanesulfonic acid and non-seasalt sulfate in the Vostok ice core: a glacial/interglacial record of biogenic sulfur emissions from the southern ocean**, *Antarctic journal of the United States*, 1991 26(5), p.88-89, 5 refs.

Dimethylsulfide (DMS) is produced biologically in the surface of oceans by phytoplankton and emitted into the atmosphere via gas exchange. In the atmosphere, DMS is rapidly oxidized by the hydroxyl ion radical to form methanesulfonic acid (MSA) and sulfur dioxide, which is converted in turn to sulfuric acid. MSA retains one of the methyl groups of its DMS precursor, making it potentially useful as a tracer for biogenic sulfur in marine aerosol and precipitation. Because non-seasalt sulfate is the principal source of fine-particle aerosols and cloud condensation nuclei in the atmosphere, it has been suggested that the atmospheric sulfur cycle may play a role in the long-term control of the radiation budget of the Earth. This article reports on a preliminary record of MSA and non-seasalt sulfate in the 2,500 m ice core from Vostok Station, central East Antarctica. The Vostok ice core has been analyzed to investigate the relationship between oceanic sulfur emissions and climate change. It contains a 160,000 year record covering the last glacial/interglacial climatic cycle.

F-48006

Zeller, E.J., Dreschhoff, G.A.M., Laird, C.M., **Development of laser ice-cutting apparatus**, *Antarctic journal of the United States*, 1991 26(5), p.89-91, 1 ref.

During the 1990-1991 field season at Windless Bight near Ross I., a 25-watt continuous infrared carbon dioxide laser was introduced as a field device to cut individual firn cores for sample preparation. The test was successful and permitted this device to be employed on a routine basis in field operations. The advantage of carbon dioxide laser cutting systems is that the beam emits at an infrared wavelength which is strongly absorbed in ice. It was demonstrated conclusively that the laser beam can cut cleanly and rapidly through both firn and ice, and that it can be manipulated efficiently with standard optical systems. In the process of this experiment, it was determined that it would be possible to develop an optical system that would permit the beam to be rotated in a circular path, a motion that could be used for cutting deep ice cores. With minor modifications, this system could be used in fluid-filled holes as well as in open holes.

F-48015

Zibordi, G., Maracci, G., **Reflectance of antarctic surfaces from multispectral radiometers: the correction of atmospheric effects**, *Remote sensing of environment*, Jan. 1993 43(1), p.11-21, 28 refs.

An atmospheric correction model, accounting for surface and sensor altitudes above sea level, is described and validated through data detected over antarctic surfaces with a Barnes Modular Multispectral Radiometer having bands overlapping those of the Landsat Thematic Mapper. The model is also applied in a sensitivity analysis to investigate error induced in reflectance obtained from satellite data by indeterminacy in optical parameters of atmospheric constituents. Results show that indeterminacy in the atmospheric water vapor optical thickness is the main source of errors in the retrieval of surface reflectance from data remotely sensed over antarctic regions. (Auth. mod.)

F-48016

Scambos, T.A., Dutkiewicz, M.J., Wilson, J.C., Bindshadler, R.A., **Application of image cross-correlation to the measurement of glacier velocity using satellite image data**, *Remote sensing of environment*, Dec. 1992 42(3), p.177-186, 15 refs.

Image-to-image cross-correlation software is applied to pairs of digital satellite images to map the velocity field of moving ice. This technique uses small-scale glacial surface features, such as crevasse scars and snow dunes, as markers on the surface of the moving ice. Applications of this procedure are demonstrated, using Ice Stream D and Ice Stream E in West Antarctica as test areas. A high-resolution map of the velocity field of the central portion of Ice Stream E, generated by the displacement-measuring technique, is presented. The use of cross-correlation software is a significant improvement over previous manually-based photogrammetric methods for velocity measurement, and is far more cost-effective than *in situ* methods in remote polar areas. (Auth. mod.)

F-48047

Kwok, K.C.S., Kim, D.H., Smedley, D.J., Rohde, H.F., **Snowdrift around buildings for antarctic environment**, *Journal of wind engineering and industrial aerodynamics*, Oct. 1992 Vol.44, International Conference on Wind Engineering, 8th, Ontario, Canada, July 8-12, 1991. Proceedings, Pt.4, p.2797-2808, 13 refs.

Based on the comparison of experimental results with field study results, the relevance and significance of various similitude parameters for snowdrift/building modelling is discussed. A series of wind tunnel model tests were carried out on a single building and groups of buildings, both on-ground and above-ground. Results of snowdrift profiles and volumes are presented. These results should augment the development of design criteria for buildings intended to survive the antarctic environment. (Auth. mod.)

F-48048

Gundestrup, N.S., Dahl-Jensen, D., Hansen, B.L., Kelty, J., **Bore-hole survey at Camp Century, 1989**, *Cold regions science and technology*, Jan. 1993 21(2), p.187-193, 14 refs.

A combination of the directional surveys of the Camp Century borehole from 1966, 1967, 1969 and 1989 has revealed a deformation pattern similar to that measured at Dye-3, South Greenland and Byrd Station, Antarctica, showing high deformation rate for Wisconsin ice. When compared to the Dye-3 profile, the deformation shows the same pattern even in details. The surface velocity obtained by integrating the borehole deformation is in agreement with that obtained from satellite measurements.

F-48049

King, E.C., Jarvis, E.P., Mowse, E.A., **Seismic characteristics of an airgun fired over snow**, *Cold regions science and technology*, Jan. 1993 21(2), p.201-207, 6 refs.

An alternative seismic source was investigated in an experiment conducted near Rothera Station, Antarctic Peninsula. The source was an airgun fired above the snow surface. Comparison shots using explosive and hammer sources were also recorded. A clear reflection was obtained from the ice/bedrock interface 300 m beneath the site on the unprocessed airgun record. On the explosive and hammer records the reflection could only be seen after frequency-wavenumber filtering had attenuated shearwaves and ground roll. The technique has potential use in profiling ice shelf thickness and seabed depth using a single small airgun.

F-48096

Lomax, A.S., **Investigation of antarctic sea ice concentration by means of selected algorithms**, *U.S. Naval Academy. Report*, May 8, 1992 USNA TSPR-188, 102p., ADA-257 132, 40 refs.

Changes in areal extent and concentration of sea ice around Antarctica may serve as sensitive indicators of global warming. A com-

parison study was conducted between the outputs of the three main algorithms currently in use (NASA Team, Comisco, and NORSEX) and a sea-ice model (Fine Resolution Antarctic Model). Data from the DMSP Special Sensor Microwave/Imager (SSM/I) were used as input algorithms for the time frame July 1987 to June 1990. Large disparities are apparent when comparing the NASA algorithm with the Comisco and NORSEX algorithms. Very large differences, some higher than 30%, exist in the marginal ice zones, along the coast, and in the Weddell and Ross Seas. Heat fluxes through recurring polynyas were calculated to quantify further differences in the algorithms; however, no conclusive patterns were apparent. No significant change in the extent or area of the ice pack occurred from July 1987 through June 1990. (Auth.)

F-48100

Zotikov, I.A., Nikolenko, A.V., **Studies of the relationship of thermophysical properties of ice to hydrostatic pressure and temperature** [Issledovaniia zavisimosti teplofizicheskikh kharakteristik l'da ot gidrostaticheskogo davleniia i temperatury], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991 Vol.71, p.22-27, In Russian with English summary. 7 refs.

The results of experimental studies on thermophysical properties of ice obtained from deep boreholes of Vostok Station are presented. The temperature conductivity of snow was determined by the "regular regime" method, with the use of cylindrical calorimeters, making it possible to create high hydrostatic pressure in the studied ice samples. The experiments were conducted under pressures of 0 to -9.8 MPa at temperatures of -30 and -35 C. It is shown that thermal conductivity of ice increases with pressure. The first experimental formulae relating thermal conductivity of glacier ice to pressure and temperature have been obtained. (Auth.)

F-48102

Samoilov, O.IU., **Air inclusions as an index of ice formation conditions on polar glaciers** [Vozdushnye vklucheniia kak pokazatel' uslovii l'doobrazovaniia na poliarnykh lednikakh], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991 Vol.71, p.118-121, In Russian with English summary. 8 refs.

The results of infiltration ice studies in the firn sequences of Spitsbergen glaciers have shown that texture peculiarities of this type of ice are caused by the effect of temperature gradients occurring in the glacier sequence in periods of ablation. The interrelations between the values of temperature gradients in snow-firn sequences and changes in the mean winter and mean annual temperatures of the air near the glacier surface are analyzed at the hypothetical level. Analytical expressions are given for the relation of autogenous air inclusions in infiltration ice to the mean annual temperature of the air and the temperature at the lower boundary of the active layer of glaciers, which can be used for paleoclimatic reconstructions. (Auth.)

F-48103

Chashchinov, IU.M., Rakhmanov, A.E., **Characteristics of the spatial structure of subsurface ice in the vicinity of Vostok Station, Antarctica** [Osobennosti prostranstvennogo stroeniia glubinnogo l'da v raione stantsii Vostok, Antarktida], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovanii*, 1991 Vol.71, p.121-125, In Russian with English summary. 16 refs.

Investigations of the orientation of optical axes of ice grains in the area of Vostok Station have been analyzed from the point of view of symmetry. It is concluded that processes of plastic deformation and recrystallization develop in the interval of 0-650 m, while the process

of plastic deformation, caused by the strained state of the shift proper, dominate at greater depths. Analysis of the changes in structural-tectonic parameters of ice, with due regard to empirical rules of metalurgy, makes it possible to obtain information on physical processes developing in the body of glaciers, and consequently, to predict physical properties of materials. (Auth.)

F-48104

Oeschger, H., **Working hypotheses for glaciation/deglaciation mechanisms**, Start of a glacial. Edited by G.J. Kukla and E. Went, Berlin, Springer-Verlag, 1992, p.273-289, 17 refs.

Ice cores from Greenland and from Vostok and Byrd stations in Antarctica for the last 150,000 years indicate that a cold climate state occurs when North Atlantic deep water formation (NADWF) is turned off and a mild climate state when NADWF is turned on. In both Antarctica and Greenland, the latest initial warming trend began about 13,000 years ago, but fewer and less abrupt oscillations appear in the antarctic cores than in the Greenland cores. Variations in CO₂, CH₄, and temperature closely parallel each other. The main deglaciations in Antarctica, 145-135,000 years B.P. and 15-10,000 years B.P., show a rise in CO₂ from 220-240 ppm to 260-280 ppm.

F-48108

Raisbeck, G.M., **Be-10 deposition at Vostok, Antarctica during the last 50,000 years and its relationship to possible cosmogenic production variations during this period**, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.127-139, 26 refs.

DLC QE697.L292 1992

Using measured concentrations of Be-10 in ice cores from Vostok Station, and assuming that past ice accumulation rates in these cores can be calculated from their stable isotope ratio δD , the authors give the Be-10 deposition rate at this location for the past 50,000 years. The Be-10 flux appears to have been relatively constant during this period, except for a 1000-2000 year interval 35,000 years ago, when it increased by a factor of 2. On the basis of these data it is unlikely that primary cosmic ray or solar modulation-induced cosmogenic production rate changes can completely account for the C-14/C-12 changes in the atmosphere during the late glacial period implied by earlier coral results. No similar conclusions regarding possible production variations due to geomagnetic field variations can be made at the present time, because it is not known how these will be reflected in Be-10 deposition over polar regions. It is also shown that the discrepancies in the U-Th and C-14 ages of corals for the period 10,000-20,000 years ago cannot be related to the Be-10 "peak" at 35,000 B.P. unless the latter is due to some solar mechanism which produces much larger production rate changes in C-14 than in Be-10.

F-48109

Beer, J., **Be-10 peaks as time markers in polar ice cores**, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.141-153, 18 refs.

DLC QE697.L292 1992

Be-10 concentration peaks observed in the ice cores from Vostok (around 35 ka B.P. and 60 ka B.P.) and Dome C (around 35 ka B.P.) offer the possibility of synchronizing the Southern and Northern Hemisphere ice core records, provided that these peaks are of global extent. A search in the Be-10 ice core records of Byrd Station and Camp Century, Greenland revealed the following results: the 35 ka

B.P. peak is clearly present in the Byrd core. Despite the coarse time resolution and missing data there is a good indication that the peak is also present in the Camp Century record. Comparisons with $\delta O-18$ and SO₄ suggest that the peak is caused by a higher production rate of cosmogenic radionuclides rather than by climatic effects. The 60 ka B.P. peak could not be found in either of these two cores. At present it is not known whether this is due to inadequate sampling or to a non-production origin of the 60 ka peak at Vostok. (Auth.)

F-48110

Jouzel, J., **Last deglaciation in Antarctica: further evidence of a "Younger Dryas" type climatic event**, Last deglaciation: absolute and radiocarbon chronologies, edited by E. Bard and W.S. Broeker. Proceedings of the NATO Advanced Research Workshop, Erice, Sicily, Dec. 1990, Berlin, Heidelberg, Springer-Verlag, 1992, p.229-266, Refs. p.257-266.

DLC QE697.L292 1992

Dome C results have shown that the last climatic transition was, in this antarctic ice core, a two-step process with two warming trend periods interrupted by a slightly colder period estimated to have taken place from about 12.8 to 13.6 kyr B.P. New results show that this cooling event is also well recorded in the Vostok record and probably in a new east antarctic core drilled at Komsomolskaia. Although apparently preceding the Younger Dryas dated from 11.0 to 10.2 kyr B.P. (C-14 ages), it is possible that the antarctic cold reversal is a Southern Hemisphere counterpart of the well-documented Northern Hemisphere cold event 1) because the accuracy of ice core absolute dating is no better than 10%, and 2) because the dating of the Younger Dryas itself may require a correction of up to 2 kyr. Recent measurements of methane concentrations in the Vostok core should provide useful information for linking Northern and Southern Hemisphere observations. Additional information concerning this period also includes the CO₂ record and the changes in dust concentration, with data now available both for Dome C and Vostok cores. (Auth.)

F-48124

Faure, G., Grootes, P.M., Buchanan, D., Hagen, E.H., **Oxygen isotope study of the ice fields surrounding the Reckling Moraine on the East Antarctic ice sheet**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.15-26, 16 refs.

The model that has been proposed for the accumulation of meteorite specimens on ice fields of the East Antarctica ice sheet suggests that partial stratigraphic sections of the ice sheet are exposed at such locations. In order to verify this hypothesis, isotope compositions of oxygen were determined in ice samples collected along three survey lines across the Reckling Moraine. The $\delta O-18$ values of the ice vary from -37.9 to -51.2 per mill relative to standard mean ocean water. The strongly O-18 depleted ice is identified as basal ice that formed during the glacial stages of the Pleistocene epoch. However, the large number of apparent transitions from glacial to interglacial ice revealed by the data suggests that the stratigraphy of the ice, and hence the climatic record it contains, may have been disturbed locally by the structural deformation of the ice sheet. Large exposures of ice that appear to lack the variations in $\delta O-18$ which characterize most of the ice in this area were discovered within and adjacent to the Reckling Moraine, but the cause for this phenomenon remains to be determined. (Auth.)

F-48129

Greischar, L.L., Bentley, C.R., Whiting, L.R., **Analysis of gravity measurements on the Ross Ice Shelf, Antarctica**, *American Geophysical Union. Antarctic research series*, 1992 Vol.57, Contributions to antarctic research III. Edited by D.H. Elliot, p.105-155 + 1 microfiche, 71 refs.

During the Ross Ice Shelf Geophysical and Glaciological Survey field program, between 1973 and 1978, gravity measurements were made at 181 sites on a 55 km grid covering the Ross Ice Shelf and along 350 km of profile lines at base camps. Marine gravity data, which have been approximately adjusted to the new datum and reference system, were used to extend coverage to the edge of the Ross Sea continental shelf. Free-air, Bouguer, and Airy isostatic anomaly maps reveal linear anomalies paralleling the Transantarctic Mountains as a dominant feature. Block faulting due to extension between East Antarctica and West Antarctica is a likely tectonic source for these features. Modeling of local gravity observations made at 5 base camps revealed probable faulting at every camp. The correspondence of modeled local structures to regional trends suggests that they are the result of regional tectonic activity. A spectral analysis technique applied to the free-air anomaly, Bouguer anomaly, and bathymetry maps of the Ross embayment revealed that relatively short wavelength (<500 km) topographic loads appear isostatically uncompensated. A simple exponential model of crustal rebound has been used to derive isochrons of ice retreat. The result generally agrees both spatially and temporally with retreat models based on ice sheet dynamics. (Auth. mod.)

F-48133

Walin, G., **On the formation of ice on deep weakly stratified water**, *Tellus*, Mar. 1993 45A(2), p.143-157, 24 refs.

Making use of the simplest possible model, the author analyzes the formation of ice on top of a weakly stratified ocean. Interest is concentrated on the consumption of freshwater associated with ice formation and the dynamics of the system when the cooling continues beyond the point where further ice formation would destroy the stability of the system. After an initial stage of ice formation the system will not overturn, but go into a stage of development which may be called "freeze melting". This stage is characterized by increasing mixed layer depth, slowly decreasing ice thickness and small but finite stability. If the freeze melting continues for a sufficiently long time, considerably longer than required for the initial ice formation, the ice cover may be removed altogether, whereupon the stratification overturns and the fresh-water in the top layer gets lost. It is suggested that if this happens one year it will contribute to pre-conditioning the system for ice-free conditions the following year. An essential condition for the analyses, which may be put in question, is the presence of at least some wind-generated turbulence and that competing mixing processes, e.g., those associated with cabbeling, do not become dominating. Observations from the Weddell Sea support the conclusion that late winter conditions in this area may be well described in terms of a freeze melting stage of development. (Auth.)

F-48136

Oglesby, R.J., **Application of equilibrium climate models to questions of glaciation at high latitudes**, New Haven, CT, Yale University, 1990, 243p., University Microfilms order No. 90-34229, Ph.D. thesis. Refs. p.205-219.

In this thesis an evaluation was made of the capabilities of the ECM to provide useful results when applied to paleoclimatic questions concerning glaciation. In the first case study the statistical dynamical model (SDM) was used to examine the implications of a warmer deep ocean for the maintenance of ice-free conditions during the Cretaceous. It was found that when deep ocean temperatures to values indicated for the Cretaceous were described, the model yielded warm mid-to-high latitude surface conditions in agreement with the geologic record. In the second case study the CCM1 was used to examine mechanisms potentially important for the initiation of antarctic glaciation which occurred no later than 38-40 Ma. The most fundamental result of this study is the difficulty of establishing an ice-free Antarctic in CCM1 even under extreme imposed conditions. In the third and final case study CCM1 was used to examine the initiation

of Northern Hemisphere glaciation, such as occurred around 2.4 Ma. The role of snowcover as an initial condition was emphasized. It was determined that CCM1 may be used to qualitatively evaluate mechanisms potentially important in determining glacial versus nonglacial conditions; may in some cases be used to provide a quantitative computation of the net snow accumulation that in turn is used to support a qualitative conclusion regarding the sign of the net accumulation; but cannot be used to provide a determination of the magnitude of net snow accumulation reliable enough to permit either implicit or explicit long-term integration. (Auth. mod.)

F-48179

Kawaguchi, S., ed, NIPR Symposium on Polar Meteorology and Glaciology, 14th, Tokyo, July 9-10, 1991, **Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6**, Tokyo, National Institute of Polar Research, 1992, 167p., Refs. passim. For individual papers see 47-3001 through 47-3013 or F-48180, F-48181, F-48185, F-48187, F-48188, I-48182 through I-48184 and J-48186.

This is a collection of papers presented at the 14th Symposium on Polar Meteorology and Glaciology held on July 9-10, 1991, in Tokyo. It consists of 13 full-length papers, of which 9 are pertinent to Antarctica, and 19 abstracts; the former are arranged in the order of scientific areas of meteorology, glaciology, and physical oceanography.

F-48180

Nakagawa, K., **Estimation of surface albedo distribution in Lützow-Holm Bay and its neighborhood with NOAA/AVHRR data**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.1-15, 17 refs.

A method has been developed for estimating the filtered narrow band surface albedo with NOAA/AVHRR data, and was applied to analysis of the surface albedo distribution in Lützow-Holm bay and its neighborhood in 1990. As a result, 16 maps of the surface albedo distribution have been drawn. From a comparison of the albedos inferred from satellite data with those actually observed in Ongul Strait, the satellite-inferred, filtered narrow band albedos agree well with the daily means of ground-observed, unfiltered broad band albedo, despite systematic errors of about - 4%. There is a characteristic pattern of surface albedo distribution in this area; the open sea has very low albedo (less than 5%), whereas most of the compact pack ice and fast ice has high albedo (more than 60%). The albedo is lower in the eastern part of Lützow-Holm Bay than in the western part. Off the Sôya Coast it is less than 40%. The ice sheet of Antarctica has remarkably high albedo (more than 80%). (Auth.)

F-48181

Yamanouchi, T., Wada, M., **Microwave signature of polar firn and sea ice in the Antarctic from airborne observation**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.16-35, Refs. p.34-35.

Airborne observations of 19.35 GHz microwave radiation were taken over the sea ice and firn cover of the antarctic ice sheet. Microwave brightness temperature was analyzed to explain satellite observations. Brightness temperature of the firn over the ice sheet varied greatly from the coast to the interior, which noticeably corresponded to the mean annual accumulation obtained at the surface. Also found was the variation of brightness temperature on a small scale of about 1-10 km, which became extreme in the sastrugi/glazed surface zone (Z route). Satellite passive microwave observations were of very low resolution, making it difficult to show these small-scale variations corresponding to the surface accumulation. In the sea ice area, the brightness temperatures were similar to the results

from the satellite, being low for multi-year ice and high for first year ice. From the flight across the Riiser-Larsen Peninsula, smooth variation up to 225 K was seen over the central part of the peninsula. Also along the flight, it was easy to distinguish the ice shelf and sea ice, even when covered with snow, by microwave brightness temperature measurement. (Auth. mod.)

F-48185

Kamiyama, K., Watanabe, O., Nakayama, E., **Atmospheric conditions reflected in chemical components in snow over east Queen Maud Land, Antarctica**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.88-98, 14 refs.

The precise vertical distribution of H₂O₂ in the surface snow layer at three different sites in the inland region of Antarctica was measured. The seasonal variation, traced from the vertical distribution of snow cover, reflects photochemical processes in the atmosphere and coincides with that of $\delta^{18}O$. The values of pH and the concentration of microparticles are also discussed in regard to photochemical and migration processes in the atmosphere. Almost all substances occurring in snow have unique origins; some of them reflect physical and chemical processes in the atmosphere. (Auth.)

F-48187

Muramoto, K., **Analysis of sea ice compactness by image processing**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.126-131, 5 refs.

Variations of sea ice extent, especially in the Antarctic, have long been thought to influence global climate. A new system, which measures the ice compactness and ice shape by means of processing video images, is described. Using the system, sea ice characteristics in the Antarctic were analyzed from images obtained on board the *Shirase* between Fremantle and Showa Station in 1988 by members of the 30th Japanese Antarctic Research Expedition.

F-48188

Enomoto, H., Tian, S.F., Yamanouchi, T., **Interannual fluctuations of sea ice extent in the Antarctic and associated atmospheric conditions**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.132-142, 16 refs.

This paper focuses on possible atmospheric driving forces causing sea ice fluctuations. It is seen from synoptic correlation maps that, in the case of larger sea ice extent, the circumpolar trough is located in the lower latitudes in Oct. A significant relationship is found also between temperature rise over Antarctica and increase of sea ice area. The implication is that the mean wind field changes due to the northward shift of the trough. An outburst of cold air from the continent seems to strengthen the advection of ice pack to lower latitudes and freezing in specific sectors. The temperature rise observed in East Antarctica is due to the advection of warm air. The variations of the circumpolar trough are important for changes in sea ice extent. Long-term fluctuations of the pressure and wind fields in the Southern Hemisphere are described. (Auth. mod.)

F-48189

Carsey, F.D., ed, **Microwave remote sensing of sea ice**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, 462p., Refs. passim. For individual papers see 47-3015 through 47-3040 or F-48190 through F-48196.

This volume contains a collection of papers structured in 27 integrated chapters, 7 of which are pertinent to Antarctica. It is intended

to provide an orderly progression from basic observations, through modeling, to geophysical interpretation, and on to the use of the data in simulations of the roles and responses of ice in the global climate system. The book covers several areas of interest in microwave remote sensing of sea ice. The individual chapters cover sea ice, its behavior, predictive models and algorithms, products, and technology.

F-48190

Carsey, F.D., Barry, R.G., Weeks, W.F., **Introduction**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.1-7, 15 refs.

This introductory chapter to "Microwave remote sensing of sea ice" reviews the sea ice and its variables, extent, its microwave properties and the developing techniques for monitoring ice conditions with microwave instruments.

F-48191

Tucker, W.B., Perovich, D.K., Gow, A.J., Weeks, W.F., Drinkwater, M.R., **Physical properties of sea ice relevant to remote sensing**, *American Geophysical Union. Geophysical monograph series*, MP 3223, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.9-28, 73 refs.

In this chapter, the authors have attempted to illuminate aspects of sea ice that are believed to affect microwave remote sensing. In doing so, it was necessary to delve in some detail into certain processes, such as ice growth and its dynamic and thermal modifications. This was done primarily to provide a brief background useful in understanding the state of the ice at various stages in its history. Although the physical properties of sea ice have been studied for many years, they have recently taken on new significance due largely to increased remote sensing of the polar regions. While the emphasis has been to characterize and understand properties important to remote sensing, the increased attention to ice properties has enabled one to better understand properties and processes in their own right. This process is expected to continue as sensors are continually refined. (Auth. mod.)

F-48192

Fetterer, F.M., Drinkwater, M.R., Jezek, K.C., Laxon, S.W.C., Onstott, R.G., Ulander, L.M.H., **Sea ice altimetry**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.111-135, 48 refs.

Potential users of radar altimetry will find sources for data from past, present, and future missions listed in Massom [1991], with a treatment of the applicability of the data to polar studies. Methods for extracting various ice parameters from the data record have been suggested in this chapter. Additional parameters and alternative ways of deriving parameters can be found in the literature. Generally, ice parameters are arrived at by first retracking and editing the altimeter data record and then deriving waveform parameters that are linked to the desired ice parameters. The processing required to derive a waveform parameter and the strength of theory linking it to an ice parameter vary. With the exception of ice edge, it has not been demonstrated that any ice parameter can be reliably retrieved from altimetry on more than a case study basis. The research reported here strongly indicates that this will change. The best hope for progress in this direction may lie in seeking an empirical connection between waveform parameters and ice conditions using global satellite data sets. (Auth. mod.)

F-48193

Comiso, J.C., Grenfell, T.C., Lange, M.A., Lohanick, A.W., Moore, R.K., Wadhams, P., **Microwave remote sensing of the southern ocean ice cover**, *American Geophysical Union. Geophysical monograph series*, MP 3227, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.243-259, 44 refs.

The physical and radiative characteristics of sea ice in the antarctic region have not been as extensively studied as in the arctic, because the former is generally more inaccessible. However, there have been some antarctic programs, mostly in the Weddell Sea, with good *in-situ* measurements, that have been used to advance the knowledge of the microwave characteristics of antarctic sea ice. In this chapter, the basic physical, radiative and backscatter properties of sea ice in the southern ocean are presented. Also, techniques used to derive geophysical parameters, including ice extent and concentration from space-based systems, are evaluated.

F-48194

Grenfell, T.C., **Considerations for microwave remote sensing of thin sea ice**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.291-301, 36 refs.

Surface-based radiometric results and principal component analysis indicate that some thin ice types can be resolved under favorable circumstances. Mixtures of thick ice and open water, however, can still give rise to ambiguities in ice type identification in available satellite data. In the Antarctic and in the northern marginal ice zones, there is often greater divergence and even more open water and thin ice than in the central Arctic. Initial comparisons of concurrent radiometric and radar data show the potential to improve discrimination of thin ice on the basis of emitted and backscattered intensities. It is expected that the ability to distinguish thin ice using satellite imagery will improve considerably with the combination of Special Sensor Microwave/Imager (SSM/I) data, high-resolution results from the First European Remote Sensing Satellite (ERS-1), and microwave models of the ice.

F-48195

Martin, S., Steffen, K., Comiso, J.C., Cavalieri, D.J., Drinkwater, M.R., Holt, B., **Microwave remote sensing of polynyas**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.303-311, 22 refs.

A polynya is a large region of open water and thin ice that occurs within much thicker pack ice. The World Meteorological Organization [1970] states that a polynya consists of open water and an associated area of thin ice with thicknesses up to 0.3 m. Whereas a lead is a long linear feature, a polynya has a rectangular or oval aspect ratio and is surrounded by large floes and thick ice. Although polynyas occur in both winter and summer, this chapter is restricted to the winter case. The region of open water or reduced ice concentration that makes up the polynya persists for periods of several days, so that the polynya is the site of large exchanges of heat between the atmosphere and ocean. The systematic study of polynyas began with the advent of passive microwave satellites; in particular, the observation from the Electrically Scanning Microwave Radiometer (ESMR) of the large Weddell Sea polynya was one of the ESMR's most intriguing discoveries. As this chapter shows, a major advantage of passive microwave is that the observations provide frequent data on ice concentrations for polynya regions.

F-48196

Garrity, C., **Characterization of snow on floating ice and case studies of brightness temperature changes during the onset of melt**, *American Geophysical Union. Geophysical monograph series*, 1992 No.68, Microwave remote sensing of sea ice. Edited by F.D. Carsey, p.313-328, 37 refs.

Significant changes in the physical properties of snow on sea ice occur during the onset of melt in the Arctic and Antarctic. These changes have been quantified for the Arctic (Greenland and Barents Seas) and Antarctic (Weddell Sea) based on 318 snow pit measurements. Using a surface-based dual-polarized 37 GHz radiometer and the Special Sensor Microwave/Imager (SSM/I), changes in brightness temperature of sea ice have been observed for increases in snow depth, wetness, stratification, and slush at the snow-ice interface. A representative model for the passive microwave response to snow metamorphism shows changes in brightness temperature due to increases in snow wetness.

F-48202

Jean-Baptiste, P., **Measurement of helium isotopes in Vostok ice core** [Analyse des isotopes de l'hélium dans la calotte polaire Antarctique: résultats préliminaires au site Vostok], *Académie des sciences, Paris. Comptes rendus. Série II*, Feb. 18, 1993 316(4), p.491-497, In French with abridged English version. 11 refs.

Samples of ice from a short core drilled at the Vostok Station were analyzed for He-3 and He-4. The samples were taken below the firn-ice transition region (which lies 90-100 m below the surface). Results suggest that between 27 and 42% of the initial helium had escaped before the ice samples were incorporated into the copper sample tubes. $\Delta\text{He-3}$ results averaged -0.8%. It is unclear whether the measured helium loss occurred only by diffusion from the ice sheet to the atmosphere or if some loss may have occurred after the core was retrieved from the drill-hole. The different causes of bias, principally linked to the high diffusivity of He in ice, are reviewed and discussed. (Auth.)

F-48223

Brandt, R.E., Grenfell, T.C., Warren, S.G., **Optical properties of snow**, *Antarctic journal of the United States*, 1991 26(5), p.272-275, 9 refs.

The interaction of the snow surface with solar radiation was studied at Amundsen-Scott and Vostok stations. The flights to Vostok Station offered the opportunity to supplement the Amundsen-Scott Station measurements at a higher, drier location 1,300 km away. The authors measured spectral albedo on several clear and cloudy days at Vostok Station, and photographed the snow grains in the uppermost layers. The variability in spectral albedo from day to day due to grain-size variations is apparently larger than any systematic variation with location from Amundsen-Scott to Vostok Station. Also measured was the downward spectral irradiance under clear sky and a variety of cloud conditions. In conjunction with the albedo measurements at Vostok, a soot survey was also conducted at that station. As at Amundsen-Scott, the snow at Vostok is polluted downwind, in the range of 1-7 nanograms of carbon/g of snow. The site chosen for albedo measurement, 1 km upwind of the station, is sufficiently unpolluted that the albedo is unaffected. A second portable spectral photometer was used at Amundsen-Scott Station to measure ultraviolet albedo of snow. Effects of sastrugi on bidirectional reflectance of snow and snow temperature were also measured. Some results are discussed.

F-48225

Harder, S.L., Grootes, P.M., Charlson, R.J., **Air-snow exchange processes**, *Antarctic journal of the United States*, 1991 26(5), p.277-278, 4 refs.

Individual daily samples from every event of snowfall, diamond dust, and frost were collected at Amundsen-Scott Station from Dec. 1990 through Feb. 1991, to address two issues: what controls the isotopic composition of precipitation, and is the isotopic composition of snow altered by sublimation after deposition. The latter is studied by determining the seasonal changes in isotopic composition of near-surface snow; the process is described. The sampling was also carried out at Vostok Station in Dec. and Jan.; the samples have not yet been analyzed for isotopic oxygen-18.

F-48241

Qin, D.H., Mayewski, P.A., Wake, C.P., Yang, Q.Z., **Anions and cations in a snow pit on the top of Nelson ice cap, the South Shetland Islands, Antarctica, *Chinese science bulletin***, Feb. 1993 38(4), p.312-316, 11 refs.

The Antarctic Ice Sheet contains a lot of detailed records of the changing processes of the environment, climate and industrialization. In recent years, glaciochemistry has been progressing rapidly. Soluble ions are the major impurity deposited on polar glaciers and also are an important aspect of glaciochemistry. Previous studies have covered several locations in Antarctica except the region around the Great Wall Station. This note presents the first measurements of soluble anions and cations in a snow pit on top of Nelson I. The characteristics of glaciochemistry and environment of the region are discussed. (Auth.)

F-48242

Price, P.B., **Mechanisms of attenuation of acoustic waves in antarctic ice, *Nuclear instruments & methods in physics research***, Feb. 1, 1993 A235(1,2), p.346-356, 34 refs.

To guide in the design of an array of acoustic detectors of ultrahigh-energy neutrino interactions leading to electromagnetic cascades in the antarctic ice, estimates of acoustic wave attenuation in the frequency regime of 1 to 100 kHz are made. The mechanisms are scattering and reflection at grain boundaries and energy loss due to internal friction. For South Pole ice at -55 C, internal friction is mainly due to proton reorientation, and is small enough to permit acoustic waves at all frequencies of interest to propagate through more than 100 m. At frequencies above about 20 kHz the attenuation is mainly due to Rayleigh scattering at grain boundaries. For a mean crystal radius of 0.1 cm at 1 km depth, estimated from available data, it is concluded that, even for a random distribution of *c*-axes, acoustic waves throughout the frequency regime of interest will lose less than about 1 dB per 100 m at -55 C. Dispersion of arrival time and energy of the acoustic wavefront due to attenuation will not degrade the ability to measure the direction and energy of the cascade. (Auth.)

F-48257

Garrity, C., **Passive microwave remote sensing of snow-covered floating ice during spring conditions in the Arctic and Antarctic**, North York, Ontario, York University, 1991, 348p., Ph.D. thesis. Refs. p.324-343.

It is possible to classify first year from multi-year ice during the onset of melt period using a dual-polarized 37 GHz radiometer. The classification is based on the emission from the snow cover instead of from the sea ice when the snow is not dry. A snow cover on first year ice is typically thinner than for multi-year ice. Once snow depth and density are obtained, the amount of water a snow cover contains can be determined. If the brightness temperature is low and polarized, there could be slush at the snow-ice interface. Mapping of slush on sea ice would be a useful parameter to shipping since slush will reduce the speed of a ship. Based on 191 snow profiles over sea ice in the Weddell Sea during the spring of 1989, snow cover on antarctic ice was more homogeneous than on arctic ice. The snow cover thickness ranged from 0.05 to 1 m on second-year ice and rafted first-year ice. Average slush thickness was 6 cm. Snow cover further from the continent towards the ice edge was more advanced in snow metamorphism. When air temperatures were less than 268 K, snow wetness

ranged from 0.1% to 0.4% where there was no slush at the snow ice interface, and from 0.4% to 2% where there was slush. When air temperatures were 268 to 273 K, snow wetness ranged from 1% to 2%, and when air temperatures were above 273 K, the snow wetness could reach 3%. (Auth. mod.)

F-48261

Lorius, C.J., Jouzel, J., Raynaud, D., **Ice core record: past archive of the climate and signpost to the future, *Royal Society of London. Philosophical transactions. Series B***, Nov. 30, 1992 338(1285), p.227-234, Refs. p.232-234.

DLC QH301.R648a

Ice cores from Antarctica provide multi proxy records of climate and environmental parameters. They have recorded glacial-interglacial temperature changes with cold stages associated with lower snow accumulation and high concentration of aerosols from marine and continental sources. The 160,000-year-long Vostok isotope temperature record exhibits signatures of the insolation orbital forcing as well as a close association between climate and greenhouse gas concentrations. These gases are likely to have played an important role in amplifying the amplitude of past global temperature changes. Data from the ice show evidence of anthropogenic impact on atmospheric greenhouse gases (CO₂ and CH₄) over the past 200 years. They suggest a climate sensitivity to greenhouse forcing which is consistent with General Circulation Model simulations for a future doubled atmospheric CO₂. Further ice coring in Antarctica should help to improve the understanding of the climate system. (Auth.)

F-48262

Drewry, D.J., Morris, E.M., **Response of large ice sheets to climatic change, *Royal Society of London. Philosophical transactions. Series B***, Nov. 30, 1992 338(1285), p.235-242, Refs. p.241-242.

DLC QH301.R648a

The antarctic ice sheet contains between 24 M cu km and 29 M cu km of ice, equivalent to a eustatic sea level change of between 60 m and 72 m. The annual surface accumulation is estimated to be of the order of 2200 Gtonnes, equivalent to a sea level change of 6 mm/a. Analysis of the present-day accumulation regime of Antarctica indicates that about 25% (*ca.* 500 Gt/a) of snowfall occurs in the Antarctic Peninsula region with an area of only 6.8% of the continent. For the Antarctic Peninsula with mountainous terrain containing ice caps, outlet glaciers, valley glaciers and ice shelves, where there can be significant ablation at low levels and distinct climatic regimes, models of the climate response are complex. In addition, owing to the high accumulation and flow rates, even short- to medium-term predictions must take account of ice dynamics. Relationships are derived for the mass balance sensitivity and, using a model developed by Hindmarsh, the transient effects of ice dynamics are estimated. It is suggested that for a 2 C rise in mean annual surface temperature over 40 years, ablation in the Antarctic Peninsula region would contribute at least 1.0 mm to sea level rise, offsetting the fall of 0.5 mm contributed by increased accumulation. (Auth. mod.)

F-48263

Parkinson, C.L., **Southern ocean sea-ice distributions and extents, *Royal Society of London. Philosophical transactions. Series B***, Nov. 30, 1992 338(1285), p.243-250, 22 refs.

DLC QH301.R648a

Results presented here show in a variety of forms some of the variability that occurred in the southern ocean sea-ice distributions and extents over the 1970s and 1980s. Interannual variability is examined by identifying changes in three measures: sea-ice extents, sea-ice distributions, and the length of the sea-ice season. Regarding these three: maximum ice extents varied by approximately 12%, decreasing during the mid-1970s, followed by increases over the next few years and a levelling off for much of the 1980s; the area of

interannual variability in monthly average sea-ice distributions in summer far exceeds the summertime area of consistent ice coverage, in sharp contrast to wintertime, when the area of consistent ice coverage is considerably larger; the length of the sea-ice season, calculated for the years 1979-1986, with satellite passive microwave data coverage through all months of the year, showed increases over that period in the Ross Sea but decreases in the Weddell and Bellingshausen seas. In both cases it appears, through comparisons with data from 1973-1976, that the 1979-1986 changes more likely reflect a fluctuating behavior of the ice cover than a long-term trend. The changes in the ice cover have influences not only on the ocean and the atmosphere but on aquatic plant and animal life as well. (Auth. mod.)

F-48298

Guichard, A., **Iceberg impact program** [Programme "Impacts icebergs"], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.81-87, In French with English summary. 12 refs.

Full scale experiments taking place on Adélie Coast to study the impact of icebergs on massive structures are discussed. The constraining geographic setting as well as the innovative aspect of those experiments impose a long-term job. After two campaigns, the methods are settled, and great hopes for the experiments of the 1991/92 summer season are expressed. Experimentation principles are outlined. (Auth. mod.)

F-48299

Eicken, H., Lange, M.A., **Drill hole and ice-core studies of sea-ice thickness distributions in the Arctic and Antarctic**, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B1-B4, 4 refs.

Extensive sea ice thickness surveys both in the Arctic and Antarctic have been performed using direct field measurements of sea ice thicknesses through mechanically drilled holes. Information obtained from drill-hole thickness profiles may be important in linking ground-truth data and remote sensing techniques. In a study conducted in the Weddell Sea, ice thickness profiles could be subdivided into four different thickness classes based on characteristics of ice thickness and snow depth probability density functions (pdf) and the actual profiles. These classes I to IV represent deformed and undeformed first-year ice, and undeformed and deformed second or multi-year ice, respectively. The ice surface of classes I, III, and IV is prone to flooding as a result of depression resulting either from the heavy snow load (classes III and IV) or from ridging (classes I and IV). This influences the microwave signature of the ice, and may provide indirect evidence of ice thickness and its smaller-scale distribution. In addition, through the resulting formation of snow ice, it influences the mass balance of sea ice. Furthermore, the abundance and spatial distribution of these ice classes in the Weddell Sea allow the speciation of dynamic processes of the sea ice cover in the area under investigation. (Auth. mod.)

F-48300

Ackley, S.F., Wadhams, P., Lange, M.A., **Antarctic ice thickness distributions obtained from aerial photography**, Sea Ice Thickness Workshop, New Carrollton, MD, Nov. 19-21, 1991. Report. Edited by A.S. Thorndike, C. Parkinson, and D.A. Rothrock, Seattle, University of Washington, Applied Physics Laboratory, Oct. 1992, p.B16-B18.

During the 1986 Winter Weddell Sea Project, aerial photographs were taken from a helicopter on over 20 occasions. These flights

obtained photographs over approximately 20 to 50 km of track with a nominal frame size of 0.75 x 0.75 km. This has resulted in 2600 frames being digitized, representing 24 different sea ice regions in the eastern Weddell Sea. Six categories of sea ice thickness were obtained, varying from black for open water through dark gray (thin nilas of 5 to 10 cm thickness), gray (nilas to young ice of 10 to 20 cm thickness), gray to gray-white (young ice of 20 to 30 cm thickness), gray-white (young ice of 30 to 40 cm thickness), and white (snow-covered floes of 40 to 80 cm mean thickness). There was a surprisingly small open water percentage of less than 2%. Over the three lowest categories, however, corresponding to ice less than 20 cm, the sum of the total area was nearly 20%. These results are similar to other distributions obtained away from the Marginal Ice Zone that suggest the actual open water fraction is generally very low in the pack ice, but the combination of open water and thin ice is generally about 10 to 30% of the total coverage. (Auth. mod.)

F-48317

Nishio, F., Cho, K., Takeda, K., Maeda, K., Kodama, T., Yamanouchi, T., **MOS-1 multi-sensor data set and sea ice study**, WMO Operational Ice Remote Sensing Workshop, 2nd, Ottawa, Sep. 10-13, 1991. Abstracts and papers. Vol.1, Ottawa, Environment Canada, Dec. 1991, p.277-287, 11 refs.

Japan's first polar orbiting earth observation satellite series MOS-1 and MOS-1b are on board with three different sensors, which are MESSR (Multi-spectrum Electronic Self-scanning Radiometer), VTIR (Visible Thermal Infrared Radiometer) and MSR (Microwave Scanning Radiometer). The great advantage of MOS-1 is that it can observe the same phenomena by three different sensors at the same time. In order to contribute to the ISY (International Space Year)/-PIE (Polar Ice Extent) Program, MOS-1 multisensor data sets of the Okhotsk Sea and the Antarctic received at Showa Station have been produced. The use of the data set for sea ice study and monitoring, and also further plans to produce the MOS-1 data set in Arctic regions, are described. (Auth. mod.)

F-48347

Vandal, G.M., Fitzgerald, W.F., Boutron, C.F., Candelone, J.P., **Variations in mercury deposition to Antarctica over the past 34,000 years**, *Nature*, Apr. 15, 1993 362(6421), p.621-623, 30 refs.

Polar ice contains a valuable record of past atmospheric mercury deposition, which can provide information about both the natural biogeochemical cycling of this toxic trace metal and the impact of recent anthropogenic emissions. But existing studies of mercury in polar ice and snow cores suffer from sample contamination and inadequate analytical procedures. Reported here are measurements of mercury concentrations spanning the past 34,000 years from the Dome C ice core, using stringent trace-metal clean protocols developed by Patterson and co-workers. Although this record does not extend into the industrial period, it provides an important baseline for future attempts to identify anthropogenic mercury in antarctic ice and snow. Mercury concentrations were strikingly elevated during the last glacial maximum (18,000 years ago), when oceanic productivity may have been higher than it is today. As oceanic mercury emission is correlated with productivity, it is suggested that this was the principal pre-industrial source of mercury to Antarctica; mercury concentrations in antarctic ice might therefore serve as a palaeoproductivity indicator for the more distant past. (Auth.)

F-48351

Sei, T., Gonda, T., **Growth rate of polyhedral ice crystals growing from the vapor phase and their habit change**, *Meteorological Society of Japan. Journal*, Aug. 1989 67(4), p.495-502, With Japanese summary. 13 refs.

Polyhedral ice crystals were grown on a growth substrate at a low air pressure of 40 Pa at -7, -15 and -30 °C at relatively low supersaturations. Measurements of the normal growth rates of ice crystals versus supersaturation and *in situ* observations of ice crystal surfaces were carried out. It is inferred that the {0001} and {1010} faces of ice crystals grown under these conditions grow by the mechanism proposed by Burton, Cabrera and Frank. The habit change of ice crystals with temperature is equivalent to the temperature dependence of the condensation coefficient of the {0001} and {1010} faces. In this paper, the formation mechanism of non-hexagonal snow crystals observed in the upper atmosphere and in Antarctica is discussed. (Auth. mod.)

F-48353

Swift, C.T., St. Germain, K.M., Menashi, J.D., **Remote sensing of sea-ice thickness in the Weddell Sea, *Antarctic journal of the United States*, 1991 27(5), p.92-93, 7 refs.**

As part of the Winter Weddell Gyre Experiment 1989, the feasibility of remotely measuring antarctic sea-ice thickness using passive microwave techniques was investigated. A description of field operations, which involved measuring the brightness temperature of sea ice in the Weddell Sea at 611 megahertz, appeared in the 1990 AJUS review issue (St. Germain and Swift, 1990). The data have now been analyzed and correlated with *in situ* thickness measurements, video recordings, and other passive microwave data. The results of this study indicate that ice thickness can be measured reliably up to 75 cm with the 611 megahertz radiometer. The field measurements were made using an ultra-high-frequency (611 megahertz) radiometer that was mounted on the port side of the *Polarstern*, looking downward to the ice at an angle of 35 deg off nadir. A 10 gigahertz radiometer was mounted on the rail next to the ultra-high-frequency radiometer, operating at a 53 deg incidence angle. Adjacent to the radiometers, a handheld video camera was operated while the ship traveled through the ice, providing a record of ice coverage within the footprint, ice thickness, and details such as ridges and hummocks.

F-48354

Jeffries, M.O., Weeks, W.F., **Fast-ice properties and structure in McMurdo Sound, *Antarctic journal of the United States*, 1991 27(5), p.94-95, 7 refs.**

In early Jan. 1991, 15 first-year cores from the fast ice in McMurdo Sound were obtained. Some preliminary results of the ice core analysis program are reported. The mean salinity of the individual fast ice cores ranged from 2.95 to 5.39 parts per thousand. The mean value of all the fast ice salinity measurements was 4.21 parts per thousand. The mean ice thickness at the 16 sites ranged from 1.25 to 2.32 m. The mean value of all the ice thickness measurements was 1.94 m. Congelation ice was observed at all fast ice sites, comprising from 30.4% to 93.6% of the individual cores. This ice type often was characterized by strongly aligned crystals, a feature also observed at many McMurdo Sound locations. Unlike the western Ross Sea pack ice, the lower portions of most fast ice cores comprised layers of congealed, densely packed platelet ice. It is believed that platelet ice growth in McMurdo Sound results from supercooling brought about by adiabatic decompression of low density seawater flowing northward into the sound from below the McMurdo Ice Shelf. The accretion of the platelet ice against the base of the overlying congelation ice sheet and its subsequent consolidation allows increased growth of the fast ice, resulting in a final thickness greater than would otherwise be possible by heat conduction from platelet-free water alone.

F-48355

Jeffries, M.O., Weeks, W.F., **Summer pack-ice properties and structure in the western Ross Sea, *Antarctic journal of the United States*, 1991 27(5), p.95-97, 10 refs.**

Most of the available information on the properties and structure of antarctic sea ice has been collected in studies in the Weddell Sea.

This report describes some of the preliminary findings from the first field and laboratory investigation of the properties and structure of western Ross Sea pack ice undertaken during the period from Dec. 1990 to Mar. 1991. Ice thickness, salinities, temperature, and structural-stratigraphic data from 17 cores are discussed.

F-48382

Mulvaney, R., Coulson, G.F.J., Corr, H., **Fractionation of sea salt and acids during transport across an antarctic ice shelf, *Tellus*, Apr. 1993 45B(2), p.179-187, 17 refs.**

Analyses of Cl⁻, NO₃⁻, SO₄²⁻, Na and Mg made on a series of surface snow samples, collected at 4 km intervals along a 116 km traverse of the Fimbul Ice Shelf, show that fractionation of some of the sea salt species has taken place. There is depletion of Mg compared to Na in the coastal part of the traverse, but the bulk sea water ratio is maintained further inland. Evidence for Cl⁻ fractionation is less clear, with a depletion in some sections and an enrichment in others compared to Na. Taken over the whole data-set of 120 samples, the bulk sea water ratio between the marine ions Na, Mg and Cl appears to be conservatively maintained. For all of the sea-salt components, the general trend in concentration showed an increase from the ice shelf front to a maximum value approximately 45 km inland, before decreasing to a value of 10% of the maximum by the end of the traverse. Non sea-salt sulphate followed a similar trend to 45 km, but the subsequent decrease in concentration was less rapid, suggesting a greater residence time for sulphate derived from marine biogenic activity than for sea-salt aerosol. Relatively high concentrations of nitrate were found in all of the surface snow samples in comparison to samples taken from shallow pits at each end of the traverse. This may indicate a post-depositional loss of nitrate from the snow surface. (Auth.)

F-48383

Hogan, A.W., Gow, A.J., **Particle transport to the snow surface at the South Pole: the beginning of a tropospheric history, *Tellus*, MP 3239, Apr. 1993 45B(2), p.188-207, Refs. p.205-207.**

Sodium concentration measurements in recent south polar snow have been compared with surface aerosol measurements made at the Amundsen-Scott Station. When a 180-day lag is applied to allow spring/summer aerosols to be precipitated and incorporated into the autumn/winter snow layer, very good correspondence exists between mean aerosol concentration in air and mean sodium concentration in snow. This paper describes analyses of meteorological and glaciological processes to define glaciological and meteorological years, which justify the use of this 180-day lag. Precipitation of sodium and other particles through coagulation and other ice crystal attachment processes is discussed relative to the meteorological year. The results indicate that additional measurements relative to the gradients of temperature, wind, precipitation, and accumulation on the Polar Plateau are essential to the formal establishment of a theory relating glaciochemical accumulation to meteorological processes, and formulating tropospheric history from glacial deposition. (Auth. mod.)

F-48386

Bentley, C.R., Sheehan, D.D., **Comparison of altimetry profiles over East Antarctica from Seasat and Geosat: an interim report, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990 26(1), p.1-9, With German summary. 21 refs.**

The Exact Repeat Mission track of Geosat over East Antarctica duplicated to within a kilometer the tracks followed a decade earlier by Seasat. As the two satellites carried similar radar altimeters, it is possible to search for changes in the surface elevation of the ice sheet along these common tracks in the coastal strip north of 72S. Here the sector between 80 and 140E is examined. There are many Geo-

sat passes for each Seasat pass, so the procedure was to define a local surface slope from the group of Geosat tracks, which spread typically over a zone 800 m wide, and to use that slope to extrapolate the Geosat-epoch elevation to the Seasat track. This was done for each elevation point along a Seasat track. Point-by-point differences were then averaged over drainage systems, which might be expected to show a single coherent behavior. Comparisons over the sea ice surrounding the continent were used in an attempt to reduce the effect of errors in orbital heights, but they have not been eliminated. Consequently, though these analyses do show some height changes, they can only be attributed to an undefined combination of orbital error and a secular change in surface elevation associated with a recent increase in surface mass balance. The results do exclude the possibility of any major imbalance, such as would be associated with an actively unstable marine-ice-sheet instability, in any of the 6 drainage systems included in the measured sector, and do suggest a significant positive difference in surface-elevation change between three convergent-flow systems and one divergent-flow system. (Auth. mod.)

F-48389

Determann, J., Oerter, H., **Dynamics of ice shelves and their sensitivity to changing mass-balance quantities: model results for Filchner-Ronne Ice Shelf, Antarctica**, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990 26(1), p.57-68, With German summary. 24 refs.

In answering the relevant question for the mass budget of the antarctic ice sheet, the ice shelves fringing the continent play an important role because they largely drain the ice flowing from inland. Using the flow law for ice, a set of differential equations describes ice-shelf flow in the horizontal dimensions. By reproducing the observed flow of the Filchner-Ronne Ice Shelf, the model is used to simulate transient ice-shelf dynamics. This implies solving the equation of mass conservation, involving accumulation rates and ablation rates from the ice-shelf surface and bottom. While glaciological field studies presently represent surface accumulation rates fairly well, there is still little access to bottom melting which seems to be one order higher in magnitude. For the central region of Filchner-Ronne Ice Shelf, rates of basal accumulation in excess of 2 m/y can be derived inversely by maintaining a basal layer of marine ice in its present extent. Analysis of an ice core sampling on Filchner-Ronne Ice Shelf about 30 km inland from the ice front reveals that this basal layer consists of ice which probably grew in the water column beneath the ice shelf. Prognostic studies comprising hypothetical distributions of accumulation and melting reveal that the ice-shelf thickness profile strongly depends on interactions with the ocean. Mass budget estimates suggest that melting at the ice-shelf bottom discharges at least as much ice as does calving at the ice front. (Auth. mod.)

F-48390

Chepurina, M.A., **One method of analyzing the interdependence of short time series** [Ob odnom iz metodov otsenki sopriazhennosti korotkikh vremennykh riadov], *Leningrad. Arkhticheskii i antarkhticheskii nauchno-issledovatel'skii institut. Trudy*, 1990 Vol.423, p.77-83, In Russian. 6 refs.

Using the example of multiyear changes in the ice area of the Davis Sea, the possibility of an objective analysis of the interdependence of their fluctuations in various regions is shown with the aid of an autoregression model. Regularities in the development of polynyas in the surveyed region reflect the characteristics of the development of ice processes through the seasons. The applied method can be used for regionalization and forecasting. (Auth. mod.)

F-48429

Dreschhoff, G.A.M., Zeller, E.J., **Nitrate signal of solar flares in polar snow and ice**, *U.S. Air Force Office of Scientific Research. Technical report*, Nov. 1, 1992 AFOSR-TR-92-0999, 23p., ADA-260 559, 20 refs.

The operations described in this report are separated into 2 sections, one involving the high-resolution sampling, analysis, and interpretation of a firn core from Windless Bight, Antarctica, and a second section concerned with the acquisition of a 120 m firn core from the GISP2 site in Central Greenland. Most of the antarctic work is involved with detailed correlation with records from two-drill cores located 10 km apart on the Ross Ice Shelf, where snow deposition involves little mixing and highly precise correlations are possible with known solar flare events. In Greenland, a much longer time period of roughly 400 years has been sampled. The core drilling was completed in June 1992 and the cores have been shipped to the National Ice Core Storage Facility in Denver, CO. The upper 12 m of firn core was analyzed on site in Greenland and shows that a high quality ice core record can be obtained. (Auth.)

F-48444

Anderson, P.S., **Evidence for an antarctic winter coastal polynya**, *Antarctic science*, June 1993 5(2), p.221-226, 16 refs.

Satellite infrared imagery and meteorological data suggest the presence of winter open water (polynya) in the coastal pack ice to the north and west of the Brunt Ice Shelf. Satellite imagery, although only available for a limited number of occasions, provided evidence for the polynya during the austral winter of 1991. Indirect meteorological observations from Halley Station provide very strong supporting evidence of open water to the west of the ice shelf in previous years. (Auth.)

F-48457

Welch, K.A., Mayewski, P.A., Whitlow, S.I., **Methanesulfonic acid in coastal antarctic snow related to sea-ice extent**, *Geophysical research letters*, Mar. 19, 1993 20(6), p.443-446, 26 refs.

Proxy records of biogenic sulfur gas obtained from ice cores suggest that variability in marine biogenic sulfur emissions may reflect changes in climate. Increased sea-ice extent has previously been proposed as one cause of relatively high methanesulfonic acid (MSA) in glacial-age ice core samples. In this paper, MSA, one of the oxidation products of the biogenic sulfur gas dimethylsulfide as recovered from snowpit samples from a coastal site in southern Victoria Land, is analyzed. Time series of MSA correlate significantly with the longest continuous record available of southern ocean sea-ice extent (two decades). (Auth. mod.)

F-48525

Tseng, Y.H., **Digital photogrammetric approach to ice-flow determination in Antarctica**, Columbus, Ohio State University, 1992, 139p., University Microfilms order No. AAD92-38289, Ph.D. thesis. Refs. p.137-139.

Monitoring and understanding motions of large ice streams in Antarctica requires vast, continuous, and accurate observations of ice flow. However, existing measuring technologies are inefficient or inaccurate in determining ice motion. An automatic, accurate, and economic method was developed to determine the parameters of ice motion (velocity, strain rates, and rotation rate) by matching multi-temporal digital images. A two-step matching process (cross-correlation followed by least-squares matching) was devised to achieve automation. Modifying traditional least-squares matching to determine the parameters of ice motion directly is one of the major achievements of this study. In order to control data quality, the tests of signal-to-noise-ratio, similarity, uniqueness, and consistency were designed to

reject data resulting from mismatches. This image-matching approach has been applied to two SPOT images and two digitized aerial photographs successfully. The results show a nice consistency with manually measured data. (Auth. mod.)

F-48532

Brandt, R.E., Warren, S.G., **Solar-heating rates and temperature profiles in antarctic snow and ice**, *Journal of glaciology*, 1993 39(131), p.99-110, 40 refs.

Observations of temperature maxima at about 10 cm depth in cold antarctic snow during summer have previously been explained by a model which proposes that solar heating is distributed with depth whereas thermal infrared cooling is localized at the surface (the "solid-state greenhouse"). When the model's spectral resolution is improved, solving for solar radiative fluxes separately in 118 wavelength bands instead of just one "average" wavelength, the temperature difference at the surface to 10 cm depth shrinks from approx. 4 K to 0.2 K and moves toward the surface, indicating that the solid-state greenhouse is largely an artifact of inadequate spectral resolution. The reason that the solid-state greenhouse effect is insignificant in the case of antarctic snow is that the wavelengths which do penetrate deeply into snow (visible light) are essentially not absorbed and are scattered back to the surface, whereas the wavelengths that are absorbed by snow (near-infrared) are absorbed in the top few millimeters. The conditions needed to obtain a significant solid-state greenhouse are examined. The phenomenon becomes important if the scattering coefficient is small (as in blue ice) or if the thermal conductivity is low (as in low-density snow, such as near-surface depth hoar). (Auth. mod.)

F-48533

Goodwin, I.D., **Basal ice accretion and debris entrainment within the coastal ice margin, Law Dome, Antarctica**, *Journal of glaciology*, 1993 39(131), p.157-166, 27 refs.

Basal ice stratigraphy in coastal ice cliffs at the Law Dome margin has revealed the basal accretion of clean and debris-bearing ice, marine congelation ice and granular marine ice inland of the margin. Co-isotopic analysis of $\delta^{18}O$ and δD isotopes together with solute chemistry were applied to determine the modes of accretion and debris entrainment. The marine congelation ice and the granular marine ice were formed from the basal freezing of desalinated sea water and the episodic mixture of basal meltwater and sea water, respectively. Two different debris-entrainment mechanisms were identified. Debris-band ice with debris concentrations of 6.3-33% (by volume) was formed from proglacial raised beach and shallow marine sediment incorporated by an over-riding advance of the margin. Two other debris-bearing ice types, dispersed debris-poor ice with debris concentrations <0.3% (by volume) and laminated debris ice with debris concentration 0.9-19% (by volume) were accreted further inland from the margin by basal regelation processes associated with the Robin (1976) heat-pump effect. (Auth.)

F-48534

Lindner, B.L., McKay, C.P., Clow, G.D., Wharton, R.A., Jr., **Global change implications for antarctic lakes**, Symposium on Global Change Studies, 4th, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.276-279, 33 refs.

Perennially-frozen lakes exist in the dry valleys of Antarctica. These lakes could serve as sensitive indicators of local climatic change because two of their physical characteristics, glacial meltwater influx (and therefore lake level), and ice cover thickness, are expected to respond to climate influences. Because the sublimation rate for ice at the top of the ice cover is about 35 cm/yr, 3 to 6 m of ice (the measured thickness of lake ice in the antarctic dry valleys) is completely renewed in about 10 to 20 years. Therefore, lake ice could represent a sensitive indicator of short-term (<100 yr) climate change, whereas glaciers and ice sheets have thousand year times-

cales. An indication that the climate of the dry valleys may already be changing is the rising lake levels. There has been a steady rise in lake levels for virtually all the antarctic lakes since 1971. For Lake Hoare, this rise averaged 8 cm/yr between 1972 and 1982. Ice thickness on Lake Hoare has decreased by 40% over the last decade. The general trend of all the lakes over the last 15 years is for thinning of ice, although the rate of change from lake to lake varies. (Auth. mod.)

F-48535

Hambrey, M.J., Alean, J., **Glaciers**, Cambridge, UK, Cambridge University Press, 1992, 207p.

This work describes and explains glaciers in all their variety, as well as the landscapes they are creating throughout six continents, including Antarctica. The climatic record of glaciers and ice sheets, and the global implications if major changes in the ice cover were to occur are also considered. The chapter on wildlife in glacial environments discusses how some animals and plants have adapted to severe climatic conditions. Over 80 full color photographs taken by the authors are included. (Auth. mod.)

F-48536

Warren, S.G., **Green icebergs formed by freezing of organic-rich seawater to the base of antarctic ice shelves**, *Journal of geophysical research*, Apr. 15, 1993 98(C4), p.6921-6928, 56 refs.

Although most icebergs are blue, green icebergs are seen occasionally in the antarctic ocean. Chemical and isotopic analysis of samples from green icebergs indicate that the ice consists of desalinated frozen seawater, as does the basal ice from the Amery Ice Shelf. Spectral reflectance of a green iceberg measured near 67S, 62E, confirms that the color is inherent to the ice, not an artifact of the illumination. Analysis of samples by fluorescence spectroscopy indicates that the blue absorption, and hence the inherent green color, is due to the presence of marine-derived organic matter in the green iceberg, basal ice, and seawater. Thick accumulations of green ice, in icebergs and at the base of ice shelves, indicate that high concentrations of organic matter exist in seawater for centuries at the depth of basal freezing. (Auth. mod.)

F-48537

Arrigo, K.R., Kremer, J.N., Sullivan, C.W., **Simulated antarctic fast ice ecosystem**, *Journal of geophysical research*, Apr. 15, 1993 98(C4), p.6929-6946, 65 refs.

This paper presents a simple two-dimensional model of first-year sea ice structure and dynamics coupled to a high resolution, time-dependent model of microalgal growth in which simulated physiological responses are determined by ambient temperature, spectral irradiance, nutrient concentration, and salinity. Results indicate that land-fast sea ice in McMurdo Sound can support a production rate of approximately 0.5 g C/sq m/d under optimal conditions, 76% of which is associated with the platelet layer where rates of nutrient exchange are relatively high. While adjustments in any biological coefficient will alter the magnitude of production in the model, the range of results permitted by uncertainty in their values is well within the bounds likely to result from normal variations in snow cover, or from the uncertainty in the rate of nutrient flux. (Auth. mod.)

F-48555

Grenfell, T.C., Warren, S.G., Mullen, P.C., **Absorption of solar radiation at the antarctic snow surface**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.151-152.

Snow albedos across the solar spectrum were measured at the South Pole in Jan.-Feb. 1986. It was found that albedo values in the

visible were 98-99% and were relatively unaffected by grain size, but grain size was the most important variable controlling albedo in the infrared. Pollution was found to be very minor. At 500 m upwind of the station, there was normally less than 1 nanogram of carbon per gram of snow (1 ppb) which reduced snow albedo by only 0.1% at the most sensitive wavelength. A graph is included which shows the observed and calculated albedos for grain sizes of 50 and 100 micron radius at wavelengths of 0.5 to 2.5 microns.

F-48600

Seppälä, M., **Stabilization of snow temperature in Dronning Maud Land, Antarctica, January 1989**, *Geografiska annaler. Series A: Physical geography*, 1992 74A(2-3), p.227-230, 9 refs.

Snow temperatures were observed on Riiser-Larsen Shelf Ice and close to Basen, Vestfjella mountains in Jan. 1989, at depths from 0 to 10 m over time intervals of 1-21 hours in two boreholes and a snow pit. The maximum difference noticed over 15h was -3.0 °C at 10 m. The coldest layer was found at -5 m. This may be caused by air circulation in the borehole. This may also influence the temperatures at the bottom of the borehole if the measurements are made long after drilling. As a result of drill heat and friction at least 15h stabilization time is recommended before the temperature measurements are made. (Auth.)

F-48618

Ageta, Y., **Annual variation of oxygen isotopic contents of drifting snow and the isotopic contents of deposited snow layers at Mizuho Station, Antarctica**, *Antarctic record*, Mar. 1993 37(1), p.24-31, In Japanese. 5 refs.

Oxygen isotopic contents of fresh snow drifts in the katabatic wind zone of Mizuho Station were measured, and the oxygen isotope profiles of deposited snow layers were obtained. The $\delta^{18}O$ contents of the snowdrifts had high values in summer (-30 to about -40 per mill); in winter, values were generally low (above -50 per mill). Deviation of relations between air temperature at sampling time and $\delta^{18}O$ content of the snowdrifts under different weather conditions are discussed. Vertical profiles of $\delta^{18}O$ content of deposited snow usually show a wide annual range and complicated annual variation when such snowdrifts accumulate continuously. Those of deposited snow in the surface layers show a narrow range (-35 to about -45 per mill) and a simplified pattern. Positions of maxima and minima in $\delta^{18}O$ profiles of deposited snow have good correlations with layering of ice crusts which were formed during hiatus periods of snow deposition. (Auth. mod.)

F-48636

Chinn, T.J., **Physical hydrology of the dry valley lakes**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.1-51, Refs. p.49-51.

This paper presents the results of 20 years of studies of the water levels and permanent ice covers of the dry valley lakes. The different hydrological types of lakes and their relationships with climate are discussed. Since systematic level records commenced during the 1968-1969 summer season, the levels of all of the enclosed lakes have risen by varying amounts. All of the lakes have permanent ice covers which undergo a vertical turnover on approximately 10-yr cycles as ablation loss from the surface is replaced by winter freezing onto the underside. The 2- to 5-m thickness of the permanent ice cover varies from lake to lake and is controlled by the annual ablation rate. The higher the ablation rate is, the thinner the ice cover is. Seasonal cycles of ice thickness reach a maximum at the end of winter in mid-Nov., and summer losses thin ice sheets by 12 to 30% by the end of Jan. Surface ablation losses average 0.3 m/a; loss rates of 5.0 mm/d in summer drop to 0.6 mm/d in winter. Bottom melt accounts for some 45 to 55% of the total summer thinning of the ice cover. Level meas-

urements made over winter at the hypersaline Don Juan Pond indicate that this lake receives groundwater inflow. The behavior of sediments carried by the ice covers is discussed, together with the behavior of lakes in contact with glaciers. (Auth. mod.)

F-48637

Wharton, R.A., Jr., McKay, C.P., Clow, G.D., Andersen, D.T., **Perennial ice covers and their influence on antarctic lake ecosystems**, *American Geophysical Union. Antarctic research series*, 1993 Vol.59, Physical and biogeochemical processes in antarctic lakes, p.53-70, Refs. p.69-70.

Environmental properties of the lakes in the McMurdo Dry Valleys are largely controlled by the presence of perennial ice covers (2.8-6 m thick). Ice cover properties are, in turn, regulated by the extreme seasonality of Antarctica and local climate. An ice cover eliminates wind-generated currents, restricts the exchange of gases between the water column and the atmosphere, reduces light penetration, and limits sediment deposition. The ice sheet on Lake Hoare in Taylor Valley thinned from 5.5 to 3.5 m between 1978 and 1983. Two hypotheses are presented to explain this ice thinning: a "regional" hypothesis which posits that the thinning is due to a change in some regional climatic parameter (e.g., mean annual air temperature) which has altered the ice cover energy balance, and a "transitional" hypothesis that the thinning is a result of a change in the mechanisms of mass loss from the surface of the ice cover. As an ice cover thins, it becomes structurally weaker and develops cracks that enhance the movement of its sediment burden into the lake. A thinner ice cover that has less sediment will result in increased light penetration into the water column. A lake's productivity should then increase, resulting in greater deposition of organic matter to the benthic microbial mats. The decomposition of this organic matter will consume O₂ and, if the abiological sources of O₂ are reduced (due to loss of O₂ to the atmosphere through a more permeable ice cover), the deep oxygenation of sediments currently observed in Lake Hoare may cease to occur. (Auth. mod.)

F-48648

Rott, H., Sturm, K., Miller, H., **Signatures of antarctic firn by means of ERS-1 AMI and by field measurements**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.227-233, ESA SP-359, 8 refs.

Backscattering coefficients, measured by ERS-1 AMI in scatterometer mode, show significant regional variations over Antarctica. The angular dependence and magnitude of these coefficients are related to the morphology of the snow, enabling the discrimination of different snow regimes. Field measurements on backscattering signatures and on snow properties in Antarctica provide the basis for the interpretation of the ERS-1 scatterometer data. Examples of field data and satellite measurements are presented for refrozen firn on the ice shelves, homogeneous snow in high accumulation zones, and strongly stratified snow in the high plateaus. (Auth. mod.)

F-48650

Ihde, J., Schirmer, U., Reinhold, A., Eck, J., **Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.241-245, ESA SP-359, 8 refs.

Presented here are the derivations of orthometric heights (sea heights) along a mean 3-day repeat cycle, and the estimation of the reproducible accuracy of the ERS-1 fast delivery altimeter heights for the antarctic ice sheet. For more than 55% of these cycles, the ac-

curacy of derived ellipsoidal ice sheet elevations is within 1 m. Comparisons of the altimeter heights with GPS and trigonometric heights indicate an agreement of better than 0.5 m on flat ice sheets. (Auth. mod.)

F-48651

Sievers, J., **Utilisation of ERS-1 data for mapping of Antarctica**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.247-251, ESA SP-359, 6 refs.

During an antarctic field campaign in Jan./Feb. 1992, a 40 km x 40 km test site located at 78S and 53W on Ronne Ice Shelf was surveyed in order to calibrate the ERS-1 sensors over snow and ice. The following ground truth measurements were accomplished within the test field: GPS positioning to achieve a digital elevation model; continuous meteorological observations at a central station; measurements of physical characteristics of the snow surface; measurement of reflection and scatter properties of snow and ice within the microwave range; and three-dimensional surveying of SAR reference points. (Auth. mod.)

F-48652

Doake, C.S.M., **Preliminary evaluation of ERS-1 altimetry over Filchner-Ronne Ice Shelf, Antarctica**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.259-261, ESA SP-359, 6 refs.

Accurate surface elevation data over the antarctic ice sheet are needed to understand how the ice sheet is changing at present and to help determine how it might respond to future global climate change. Range measurements from the ERS-1 URA fast delivery data product have been used to construct a preliminary map of surface elevation for Filchner-Ronne Ice Shelf. The map shows several important features related to processes controlling the movement of the ice shelf and its interaction with the underlying ocean. Elevation data over Berkner I. have been compared to a Digital Elevation Model constructed from airborne data, and show slope-induced errors of up to 50 m. Analysis of waveforms derived from raw data suggest that there is little tracker bias.

F-48653

Viehoff, T., Lemke, P., Dierking, W., Schmidt-Gröttrup, M., **Air-sea-ice interactions in the Weddell Sea**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.325-327. ESA SP-359.

As part of the Programme for International Polar Oceans Research, ground measurements were carried out during two cruises of RV *Polarstern* to the Weddell Sea. These ground based data together with several remote sensing techniques (SAR, AVHRR, SSM/I) and coupled ocean-ice-atmosphere models will be used for the geophysical interpretation of sea ice dynamics in the Weddell Sea.

F-48654

Mantripp, D.R., Ridley, J.K., **Validating the UK-PAF land ice product surface elevation**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.483-488, ESA SP-359, 11 refs.

The UK-PAF ERS1.ALT.LIR product is designed to provide users with measurements of geophysical parameters over continental

ice sheets. The PAF philosophy of providing fully calibrated and validated products extends to these data, and as part of this process a series of field experiments were carried out in Jan./Feb., 1992 on Filchner Ice Shelf by a team from MSSL. The objectives of the field-work were to obtain Cal/Val data for ice shelf elevation and radar backscatter. This paper discusses the preliminary work towards establishing a method for external calibration of surface elevation.

F-48658

Van der Veen, C.J., **Land ice and climate**, Climate system modeling. Edited by K.E. Trenberth, Cambridge, England, University Press, 1992, p.437-450.

Possible responses of the Greenland and antarctic ice sheets to global warming are compared. The Greenland ice sheet loses most of its ice through surface melting, whereas the antarctic ice sheet loses most of its ice through calving. Since global warming could result in increased precipitation, it is suggested that the antarctic ice sheet might grow while the Greenland ice sheet would shrink.

F-48681

Allison, I., Brandt, R.E., Warren, S.G., **East antarctic sea ice: albedo, thickness distribution, and snow cover**, *Journal of geophysical research*, July 15, 1993 98(C7), p.12,417-12,429, 41 refs.

This paper evaluates characteristics of springtime sea ice off East Antarctica as investigated during a cruise of the Australian National Antarctic Research Expedition in Oct. through Dec. 1988. The fractional coverage of the ocean surface, the ice thickness, and the snow cover thickness for each of several ice types were estimated hourly for the region near the ship. Ice thickness averaged over the ice-covered region only is relatively thin, ranging from 0.35 m near the ice edge to 0.65 m in the interior. The average snow cover thickness on the ice increased from 0.05 m near the ice edge to 0.15 m in the interior. Average ice concentration increased from less than 6/10 near the ice edge to 8/10 in the interior. The ship-observed concentrations were in good agreement with concentrations derived from passive microwave satellite imagery, except in some regions of high concentration. Area-averaged albedos for the East Antarctica sea ice zone in spring were derived from representative allwave albedos together with the hourly observations of ice types. These area-averaged surface albedos increased from about 0.35 at the ice edge to about 0.5 at 350 km from the edge, remaining at 0.5 to the coast of Antarctica. The low average albedo is in part due to the large fraction of open water within the pack, but extensive fractions of almost snow-free thin ice also play an important role. (Auth. mod.)

F-48682

Wamser, C., Martinson, D.G., **Drag coefficients for winter antarctic pack ice**, *Journal of geophysical research*, July 15, 1993 98(C7), p.12,431-12,437, 18 refs.

This paper presents air-ice and ice-water drag coefficients referenced to 10-m-height winds for winter antarctic pack ice, based on measurements made from R/V *Polarstern* during the Winter Weddell Sea Project, 1986 (WWSP-86), and from R/V *Akademik Fedorov* during the Winter Weddell Gyre Study, 1989 (WWGS-89). A single (average) ice-water drag coefficient for both WWSP-86 and WWGS-89, estimated from periods of ice drift thought to represent free-drift conditions (air-ice stress balanced by ice-water drag and Coriolis force), is .00113, and the ice-water turning $\beta = 18 \pm 18$ deg. This drag value is significantly lower than arctic values for thick multiyear ice, but is similar to the values obtained by Langleben (1982) for first-year arctic ice. Consistent with previous findings for WWSP-86, the free-drift form of the momentum balance can be used to describe the observed WWGS-89 ice drift observations by using an "effective" drag coefficient and turning angle that subsume the influence of ice-ice interaction. For a typical antarctic winter pack ice cover, it appears that the ice cover reduces the momentum flux from the atmosphere to the ocean by approx. 33%. (Auth. mod.)

F-48683

Andreas, E.L., Lange, M.A., Ackley, S.F., Wadhams, P., **Roughness of Weddell Sea ice and estimates of the air-ice drag coefficient**, *Journal of geophysical research*, MP 3270, July 15, 1993 98(C7), p.12,439-12,452, 44 refs.

The authors report snow surface, ice surface, and ice underside roughness, computed from 47 surface elevation profiles collected during a transect of the Weddell Sea. The roughness for each surface, parameterized as the standard deviation of the surface elevation, segregates according to whether or not a floe has been deformed: deformed ice has greater roughness than undeformed ice. Roughness spectra for all three surfaces and for both deformed and undeformed ice roll off roughly as $1/k$ when the wavenumber k is between 0.1 and 3 rad/m. The snow surface and underside spectra roll off somewhat faster than $1/k$, and the ice surface spectra roll off somewhat slower than $1/k$. It is likely that the excess spectral intensity at high wavenumbers in the antarctic ice surface spectra results from the small-scale roughness that the ice sheet had on consolidation. A remote measurement of roughness will facilitate the decision regarding degree of ice floe deformation. This spectral analysis hints that remote sensing may also be able to differentiate between first-year and second-year ice. From the snow surface spectra, a roughness scale parameter which combines the air-ice momentum coupling permits estimates of the neutral stability drag coefficient referenced to a height of 10 m. (Auth. mod.)

F-48712

Corr, H., Moore, J.C., Nicholls, K.W., **Radar absorption due to impurities in antarctic ice**, *Geophysical research letters*, June 7, 1993 20(11), p.1071-1074, 19 refs.

Measurements of radar echo strength have been carried out on Ronne and George VI Ice Shelves. The differences in ice-column absorption between the two sites cannot be resolved by considering ice temperatures alone. An absorption model is presented that resolves the discrepancy by considering both the ice temperature and the ice impurity concentrations. In antarctic coastal sites the concentrations of acid and sea salt impurities, both of which affect absorption, have a marked spatial variability and can dominate the absorption budget. With the absorption model, impurity levels in the ice column at the George VI site are deduced from the radar strength measurements and found to be typical of levels measured in antarctic ice at similar elevations and distances from the sea. In particular the measurements suggest that the concentrations of biogenically-derived acids are much lower than the unusually high levels found on the east coast of the Antarctic Peninsula. (Auth.)

F-48725

Jouzel, J., **Extending the Vostok ice-core record of palaeoclimate to the penultimate glacial period**, *Nature*, July 29, 1993 364(6436), p.407-411, 26 refs.

The ice-core record of local temperature, dust accumulation and air composition at Vostok Station now extends back to the penultimate glacial period (140-200 kyr ago) and the end of the preceding interglacial. This yields a new glaciological timescale for the whole record, which is consistent with ocean records. Temperatures at Vostok appear to have been more uniformly cold in the penultimate glacial period than in the most recent one. Concentrations of CO₂ and CH₄ correlate well with temperature throughout the record. (Auth.)

F-48728

Garrison, D.L., Close, A.R., **Winter ecology of the sea ice biota in Weddell Sea pack ice**, *Marine ecology progress series*, June 3, 1993 96(1), p.17-31, 62 refs.

During winter 1988, the ice community in the ice edge region of the Weddell and Scotia Seas was examined. Temperature at the ice

surface generally followed air temperature, but with a short lag period; *in situ* salinity in the upper layer of ice floes reached >100 per mill; ice floes had variable amounts of snow cover; floes were primarily comprised of congelation ice (56%) and frazil ice (41%). Total integrated chlorophyll as well as chlorophyll concentrations and integrated POC, PON and ATP generally increased with increasing ice age or thickness. High C:chl *a*, C:N and C:ATP ratios characterized all ice types and suggested substantial detritus in the ice. The ice biota was comprised of bacteria, algae, protozoans and some metazoa. Microscopically estimated biomass in floes ranged from <50 to >1000 mg C/sq m, with the highest values from older ice floes. The winter ice assemblage did not differ markedly from the assemblages found during other seasons, and overall the seasonal biomass variation within the pack ice community appears to be low. Resting stages such as archaeomonads and dinoflagellate cysts were common in the ice, and cyst formation for the dinoflagellates appears to take place during the winter as well as in the late summer. Although earlier studies have emphasized the importance of harvesting and concentration of organisms from the water during episodes of frazil ice formation, evidence for this did not appear in the present analysis of biomass associated with different structural types of ice. (Auth. mod.)

F-48732

Vasil'ev, N.I., Kudriashov, B.B., Talalai, P.G., Chistiakov, V.K., **Core drilling by electromechanical drill**, *Polar record*, July 1993 29(170), p.235-237, 10 refs.

Core drilling is considered to be the most effective method of studying glaciers and sub-glacial rock. Thermal drills suspended on cables are very simple in construction and enable the drilling of deep bore-holes in firn and ice. However, mechanical drilling is characterized by lower energy consumption and a higher rate of penetration. Moreover, drilling of sub-glacial rock and ice containing mineral inclusions becomes possible only by using electromechanical drills suspended on cables. These types of drills, used at Vostok Station beginning in Mar. 1989, and their effectiveness are described.

F-48763

Qin, D.H., **Distribution of δD in 25-cm surface snow along trans-antarctic route II: The "1990 International Trans- Antarctic Expedition" glaciological research**, *Science in China*, Mar. 1993 36(3), p.375-384, 19 refs.

On the route of the 1990 International Trans-Antarctic Expedition 104 snow samples were collected in 25 cm surface snow along a 5,986 km route on the antarctic ice sheet from west to east. The geographical distribution of δD across Antarctica by the longest route is obtained from stable isotope analysis for the first time. After discussing regional differences of physical geographic conditions, maritime- continental influence, altitudes and latitudes at sampling sites, the distribution of δD is considered to have a close relation to latitude, but the topographic effect is prominent in some particular regions. The mean annual temperature at sampling sites and its relationship to δD in surface snow covering Antarctica from west to east are discussed also. The δD -temperature gradient from the south end of the Antarctic Peninsula to Vostok is very close to that in Terre Adélie obtained by predecessors. Snow-drift may make an important contribution to the relatively high δD -temperature gradient from Vostok to Mirnyy. (Auth. mod.)

F-48764

Lang, S.J., **Isotopic analysis of carbon dioxide from air trapped in polar ice**, Melbourne, University, 1991, 148p., M.S. thesis. Refs. p.135-143.

CO₂ concentrations in parts per million by volume (ppmv) from isotopic analysis of air trapped in Greenland and antarctic ice cores are compared. The records indicate that the CO₂ concentration in the atmosphere was 180-200 ppmv during the last glacial maximum

about 18,000 years B.P., about 270 ppmv by 1740, about 315 ppmv in 1958 when the rate of increase was 0.6 ppmv per year, and presently 353 ppmv, with a rate of increase of 1.8 ppmv per year.

F-48767

Wang, Z.P., Dieckmann, G.S., **Ecological environmental features of antarctic sea ice and its role in the marine ecosystems**, *Antarctic research (Chinese edition)*, 1993 5(1), p.1-15, In Chinese with English summary. Refs. p.13-15.

The development and physical properties of antarctic sea ice (including fast ice and pack ice), and the mechanism for algal assemblage in sea ice, are described. The ecological characteristics of microbiota in sea ice and its role in maintaining marine primary productivity and improving the transportation of biotic energy are discussed. (Auth. mod.)

F-48789

Lucchitta, B.K., Bertolini, L.M., Ferrigno, J.G., Williams, R.S., Jr., **Monitoring the dynamics of the antarctic coastline with Landsat images**, *Antarctic journal of the United States*, 1991 26(5), p.316-317, 4 refs.

An extensive set of Landsat images covering Antarctica was acquired in the early to middle 1970s. Recently, an international consortium of the Scientific Committee on Antarctic Research began a program to obtain new Landsat images over the antarctic coastal region. Pairing these later views with scenes imaged earlier will permit changes in the coastline to be monitored. The pilot study showed that the images, after scanning, digitizing, and registration, can be manipulated by image-processing techniques. These techniques enable one to compare the extent of shelf ice, glaciers, and open-water or seasonal ice and to map and quantify the changes.

F-48825

Reiprich, S., Brodscholl, A.L., **Magnetic investigations of the Ekström Ice Shelf, Antarctica**, *Polarforschung*, 1991 (Pub. 1992) 61(2/3), p.113-129, 12 refs.

Analysis of geomagnetic measurements carried out on the Ekström Ice Shelf during the overwintering campaign of 1987 reveals a high reliability of the differential total intensity field determination, as the error is only 5 nT. The measured values were separated from external variations and the normal field with data from the Georg von Neumayer observatory sited north of the Ekström Ice Shelf, and IGRF 85 model data, respectively. The reduced geomagnetic differential total intensity field values are called *deltaT* red-anomalies. The results are: a prominent *deltaT* red-anomaly in the center part and a positive coast parallel anomaly in the north of the Ekström Ice Shelf. Upward field continuation reveals a good agreement with a map derived from Soviet aeromagnetic measurements. Power spectra analysis and forward modelling calculations suggest a Curie-depth of about 12 to 18 km. True locations of the geomagnetic anomalies are calculated by the method of reduction to the magnetic pole. (Auth. mod.)

F-48829

Van der Veen, C.J., **Ice sheets: growing or shrinking**, *Earth in space*, Jan. 1993 5(5), p.5-9.

Satellite studies are helping to monitor the thickening and thinning of Greenland and antarctic ice sheets. Used with other study techniques, satellites prove valuable in getting an accurate picture of glacial activity. This paper examines the problems and prospects for such glaciological studies, and discusses glacier mass balances in both regions.

F-48842

Boutron, C.F., **Changes in cadmium concentrations in antarctic ice and snow during the past 155,000 years**, *Earth and planetary science letters*, June 1993 117(3/4), p.431-441, 35 refs.

Changes in Cd concentrations in antarctic ice and snow during the last full climatic cycle (the past 155,000 yrs) have been investigated by analyzing various sections of the Dome C and Vostok deep ice cores and several blocks of recent snow. Each sample was mechanically decontaminated using ultraclean procedures and then analyzed for Cd by the new ultrasensitive laser-excited atomic fluorescence technique. Cd concentrations are found to have been highly variable in ancient antarctic ice, and therefore in the past pristine south polar atmosphere during the last climatic cycle, the highest values being observed during the cold terminal stages of the last and next to last ice ages. Concentrations measured in recent antarctic snows are comparable with those in antarctic Holocene ice several thousand years old, which suggests that the anthropogenic influence is probably still negligible for this heavy metal in the south polar atmosphere. For some of the samples, measured Cd concentrations can be simply accounted for by rock and soil dust and volcanic emissions, while for others there is a significant excess over the contributions from these two sources. (Auth.)

F-48847

Lliboutry, L.A., **Ice sheet dynamics**, NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.399-416, 32 refs.

DLC QB500.5.F56

Polar ice sheets are often very anisotropic, and there is a lack of quantitative models for predicting their fabrics and behavior. In this paper the full rheological law of anisotropic ice with rotational symmetry, to be used in 3-D modelling, is given. Considered successively are the kinematics, the driving forces, and the temperature distribution, with the case of a base at the melting point of ice sheets. Lastly, the exact rheology of polar ice, which depends on a slowly evolving fabric, is examined. (Auth. mod.)

F-48848

Kamb, B., **Glacier flow modeling**, NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.417-506, Refs. p.497-506.

DLC QB500.5.F56

This article reviews salient principles and physical foundations of glacier flow modeling with some comparison of modeling results and observations. The treatment employed is essentially mathematical, and particular reference is made to both arctic and antarctic glacial contexts.

F-48858

Guichard, A., **Iceberg impacts on massive structures** [Impacts d'icebergs sur une structure massive], Université de Paris 6 (Pierre et Marie Curie), 1992, Var. p., Ph.D. thesis. In French with English summary. 147 refs.

Structures threatened by icebergs appear with the development of polar regions. A review of general iceberg features allows one to

specify the conditions of a possible collision. The study of the mechanical behavior of ice and impact simulations allows one to assess the effects of a collision on a massive structure and to determine the influence of various parameters. The knowledge of the scale effect, which turns out to be crucial, implies full scale tests. The elaboration and the carrying out of experiments in the Antarctic provide interesting initial data. (Auth.)

F-48979

Barry, R.G., **Advances in sea-ice research based on remotely sensed passive microwave data**, *Oceanography*, 1993 6(1), p.4-12, 35 refs.

This paper surveys the unique contributions that have been made to knowledge of polar sea ice since the early 1970s through the application of passive microwave remote sensing techniques, supported chiefly on satellite platforms. The combination of all-weather capability and the absence of any dependence of microwave emission on solar radiation permits satellite borne radiometric surveys to yield data particularly suited to polar applications. (Auth. mod.)

F-48984

Miller, H., ed, Oerter, H., ed, **Filchner-Ronne Ice Shelf programme, Report No.5 (1991)**, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, 66p., Refs. passim. For individual papers see F-48985 through F-48994 or 48-2 through 48-11.

DLC G890.F55K47

The 6th International Workshop of the Filchner-Ronne Ice Shelf Program was held at Fjaerland, Norway on June 10-11, 1991. This Report No.5 contains summaries of recent work presented at the meeting as well as brief summaries of some of the discussion topics.

F-48985

Sievers, J., Heidrich, B., **Digital coastline of Filchner-Ronne-Schelfeis: interpretation of high quality satellite imagery**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.4-7.

DLC G890.F55K47

A digital topographic database has been prepared covering the coastal regions of western Neuschwabenland, Coats Land and Filchner-Ronne-Schelfeis. A number of 80 geo-referenced Landsat-MSS scenes are being used to interpret and classify the topographic features on the imagery. The subsequent digitization was carried out with the Computer Assisted Resource Information System (CARIS). By processing the satellite image data in digital form, the database achieves a geometric accuracy of a high level and superior homogeneity of the topographic survey.

F-48986

Vaughan, D.G., Doake, C.S.M., Mantripp, D.R., **Thematic maps of Filchner-Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.8-11, 4 refs.

DLC G890.F55K47

As part of a cooperative cross-disciplinary project to compile and publish a series of thematic maps of Filchner-Ronne Ice Shelf, the authors have reanalyzed radio-echo sounding data collected during various field airborne campaigns between 1975 and 1988. Included are maps comprising ice thickness and surface elevation. The methods used in measuring ice thickness and calculating ice surface elevation are described.

F-48987

Oerter, H., Eicken, H., Miller, H., **Physical properties of the marine ice under the Filchner-Ronne-Schelfeis: some preliminary results**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.13-18, 8 refs.

DLC G890.F55K47

During the 1989-1990 summer season, an ice core (3" diameter) was recovered to a depth of 215 m from the central part of the Filchner-Ronne Ice Shelf. At this location, ablation takes place at the ice shelf bottom. At a depth of 152.8 m, the authors found a distinct boundary between the meteoric ice and ice of marine origin, which lacked air inclusions but contained layers and strings of particulate matter. Twenty-six horizontal thin sections, taken from the ice core at about 10 m intervals, were analyzed, revealing differences in ice texture between meteoric and marine ice.

F-48988

Minikin, A., **Preliminary results of the isotopic and chemical investigation of the 214 m ice core from the Ronne Ice Shelf, Antarctica. (Extended summary)**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.19-24, 7 refs.

DLC G890.F55K47

During the 1989-90 field season, a 214 m deep ice core was recovered from the central part of the Filchner-Ronne Ice Shelf. The drilling site B13 was chosen 50 km southwest of the Filchner Station, about 30 km south of the ice edge, so that the ice core includes the so-called marine ice accumulated from the water column beneath the 152 m thick layer of meteoric ice. Preliminary results of the first isotopic and chemical investigations of both types of ice are summarized.

F-48989

Nicholls, K.W., Makinson, K., Robinson, A.V., **Direct oceanographic observations from under the Rutford flowline, Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.27-31, 4 refs.

DLC G890.F55K47

In Jan. 1991 a hot-water drill was used to penetrate 560 m of ice on Ronne Ice Shelf, 300 km from the ice front. The drill site was on the Rutford flowline. The drill, powered by 3 heat exchangers, is described and a sketch of the drilling set-up is shown. A special purpose conductivity-temperature-depth (CTD)/water sampling system was used to measure several CTD profiles, and to retrieve 5 water samples. Graphs are presented showing the temperature and salinity profiles that were obtained over a 17 hour period. They show 3 broad regions. The upper 100 m is well-mixed, with a potential temperature and salinity of -2.30 C and 34.57. The layer from the sea floor, at about 850 dbar, up to 750 dbar is also quite well-mixed, and has a potential temperature and salinity of -2.00 C and 34.69. The upper 60 or 70 m of the transition region is quite uniform in temperature and salinity, but not to the same extent as the top region. The rest of the transition region displays a sharp pycnocline.

F-48990

Jenkins, A., **Ice shelf basal melting: implications of a simple mathematical model**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.32-36, 6 refs.

DLC G890.F55K47

Jenkins (1991) presented a simple model of sub-ice-shelf ocean circulation and applied it to the problem of explaining the observed rates of melting and freezing at the base of Ronne Ice Shelf. Thermohaline forcing of the model ocean is a direct result of the processes of mass and energy exchange at the ice-water interface, which serve to transform Western Shelf Water (WSW) into Ice Shelf Water (ISW) having characteristics akin to those derived by Schlosser et al. (1990) from field measurements. The strength of the circulation and the rate and distribution of basal ablation and accumulation are controlled by three factors, namely the depth of the ice shelf base, the basal gradient and the temperature of the underlying water. The aim of this study is to quantify the influence of each of these three parameters on ice shelf basal melting and shelf water mass modification. A series of model runs were undertaken using a simple linear ice shelf basal profile as input. The mean melt rate and the concentration of melt-water in the ISW at the end of the integration were calculated for various values of grounding line depth, basal slope and ambient water temperature. The principal results and a few of their implications are summarized.

F-48991

Morris, E.M., Vaughan, D.G., **Glaciological measurements on the south Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.37-44, 21 refs.

DLC G890.F55K47

In the 1988/89 season, 6 strain rosettes were established close to the southern boundary of Ronne Ice Shelf. In 1989/90, 2 of these rosettes were resurveyed for strain rate and the new position of site 5 was determined. In the 1990/91 season, 6 South Ronne strain rosettes were remeasured and 4 new sites (sites 7 to 10) were added to the scheme to clarify details of the ice flow. In addition, 10 m cores were drilled at 6 of the sites to determine density profiles and mean annual temperatures. At 2 of the sites the core was sampled for isotopic analysis to determine accumulation rate over the past few years. Preliminary results—on ice flow velocity, borehole temperatures, and snow densification and accumulation rates—are discussed and presented in tables.

F-48992

Graf, W., **Isotopic and chemical investigations of 10 m firn cores from the eastern part of the Ronne Ice Shelf, Antarctica. (Extended summary)**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.45-53, 9 refs.

DLC G890.F55K47

First results of the chemical analysis by ion chromatography, and previous data from the central Filchner-Ronne Ice Shelf region, reveal a distinct change in firn chemical composition with distance from the ice edge. Due to the relatively close source region (the Weddell Sea) the concentrations of sea salt (derived from chloride) and methanesulfonic acid (MSA), a reference element for biogenic sulfur, decrease systematically with increasing distance from the coastline. Nitrate concentrations, however, are essentially constant, showing that the ocean does not contribute substantially to the antarctic nitrate budget.

F-48993

Corr, H., Nicholls, K.W., Moore, J.C., **Impurity concentrations inferred from radio echo sounding**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.54-57, 6 refs.

DLC G890.F55K47

During the 1990-91 antarctic field season a site survey was performed in the vicinity of the proposed 1991-92 drill site on Ronne Ice

Shelf. Ice thickness and reflected signal strength were measured using a 30 MHz monopulse radio echo sounder. The same radio echo sounder was used on George VI Ice Shelf where a thermistor cable had previously been frozen into a hot water-drilled ice column. The radar measurements were primarily taken at this site for calibration and validation purposes, as the ice thickness is accurately known from the drilling. It was found that the reflected signal strengths from both sites were equal to within 1 dB. Analysis of the radar data by separating the transmission and reflection losses into their constituent parts has allowed the impurity concentrations of acids and salts in the ice to be inferred.

F-48994

Mantripp, D.R., Ridley, J.K., **Densely spaced radar altimeter coverage of antarctic ice shelves**, Filchner-Ronne Ice Shelf programme, Report No.5 (1991), edited by H. Miller and H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1991, p.58-62, 7 refs.

DLC G890.F55K47

To demonstrate the potential of dense radar altimeter data, the authors show results from the U.S. Navy's GEOSAT Geodetic mission. The raw data were collected in 1985 and 1986, but have only recently been declassified for the south polar region. These data are used to determine the extent and topography of Wilkins Ice Shelf, off the coast of Alexander I.

F-49016

Tison, J.L., Ronveaux, D., Lorrain, R.D., **Low salinity frazil ice generation at the base of a small antarctic ice shelf**, *Antarctic science*, Sep. 1993 5(3), p.309-322, 28 refs.

Chemical, isotopic and crystallographic characteristics of marine ice formed at the base of the Hells Gate ice shelf in Terra Nova Bay allow a better understanding of the dynamics of marine ice accretion under small ice shelves. The observed properties of the different types of frazil ice found in the area immediately behind the ice shelf front are due to a progressive evolution of the individual frazil ice crystals initially accreted at the base of the ice shelf. Basal melting caused by descending plumes of water masses at a temperature above their local freezing point initiates partial melting of the frazil ice crystals. This dilutes the interstitial water and initiates chemical sorting effects as diffusion proceeds from the normal sea water in the free water column to the diluted interstitial water in the loose frazil layer. Different environmental conditions will result in contrasting properties. Where the subglacial interface is sculptured with domes or inverted channels, it will favor the accumulation of thick units of frazil ice in a calm environment that will be further protected from convection mixing over long time periods. This will result in the formation of orbicular frazil showing c-axes at random, strong dilution and important sorting effects. (Auth. mod.)

F-49025

Xiong, H.G., Cui, Z.J., **Frost physical weathering in the Great Wall Station area, Antarctica**, *Antarctic research*, Dec. 1992 3(2), p.1-7.

Weathering observation sites were set up at different heights and 20 different cliff walls in the Great Wall Station area from 1987 to 1991. The relationship between the rock physical weathering and season, height, and face type is discussed. Results are compared with those obtained from studies in other periglacial areas in the world. The rock weathering at the southeastern face of the sea stack was found to be greater than that at the northwestern face, under the same environmental conditions. It is suggested that the causes of physical weathering in this area are climate and position of the rocks. The local temperature being below zero from 6 to 8 months a year, the freeze-thaw process is considered to be limited. (Auth. mod.)

F-49057

Van Ypersele, J.P., **Coupled ocean and sea-ice models: review and perspectives**, NATO Advanced Research Workshop on Climate and Geo-Sciences, Louvain-la-Neuve, Belgium, May 22-27, 1988. Proceedings. A challenge for science and society in the 21st century. Edited by A. Berger et al, NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.285, Dordrecht, Kluwer Academic Publishers, 1989, p.253-277, Refs. p.273-277.

DLC QC980.N38

This article reviews the existing coupled models of ocean and sea ice used in climate studies, and describes the methods used to realize their coupling. The role of sea ice in the climate system is first described. Then a brief history of uncoupled sea-ice modelling is presented, following a hierarchical approach. The coupling of ocean and sea ice is divided into three areas: heat, momentum, and salt. Each area of coupling is reviewed in detail. Typical examples of coupled sea-ice/ocean models are discussed. An example of application of a coupled model to the simulation of the Weddell Polynya is presented. It is shown that above-freezing sea-surface temperature in the polynya area is associated with intense convection, and that ice divergence helps to precondition the area for overturning. Perspectives on possible and needed progress in coupled ocean/sea-ice modelling are outlined. (Auth.)

F-49058

Vihma, T., Launiainen, J., **Ice drift in the Weddell Sea in 1990-1991 as tracked by a satellite buoy**, *Journal of geophysical research*, Aug. 15, 1993 98(C8), p.14,471-14,485, 35 refs.

Ice drift in the Weddell Sea was studied by using a satellite buoy deployed on an ice floe. The buoy survived for a 20-month period, indicating a drift trajectory of 10,000 km and yielding 13 months of marine meteorological data. The drift of the ice floe was studied with respect to the winds measured by the buoy. In the central Weddell Sea, the mean drift speed of the ice floe was 0.15 m/s, which was about 3% of the wind speed. On time scales of days the drift was primarily wind-dependent, except for cases during winter periods of high ice concentration and internal ice resistance. For time scales of several months, purely wind-based simulations of the drift resulted in a discrepancy between the observed and simulated trajectories, but the inclusion of a slow residual current made the simulations significantly better. The geostrophic wind based on the European Center for Medium-Range Weather Forecasts pressure analyses was estimated for a 1-month period, and the ice floe was found to drift almost parallel to the geostrophic wind with a speed of 2% of the geostrophic wind speed. Inertial-type motion superimposed on the wind-induced drift was found to be a characteristic feature in the marginal ice zone during the austral summer, but it could not be found from the drift in winter when kinetic energy was transferred to larger scales of motion and dissipated into the ice field. (Auth. mod.)

F-49062

Tezkan, B., Yaramanci, U., **Effect of sea tides on gravity tidal observations on the antarctic Ekström ice shelf**, *Geophysical journal international*, Sep. 1993 114(3), p.561-568, 28 refs.

Simultaneous time series of gravity variations on an ice shelf and sea-level fluctuations in the Antarctic have been analyzed. The gravity data were recorded in the observatory of the Georg von Neumayer (GvN) Station on the Ekström Ice Shelf by an Askania GS-15 earth-tide gravity meter. An Aanderaa pressure recorder was used on a mooring 10 km north of the ice-shelf edge in a water depth of 468 m to measure the sea-level fluctuations. Both time series are approximately one year in length. The vertical movement of the ice

shelf is modelled by a simple elastic model. The ice shelf is taken as a uniform elastic beam floating on the sea and clamped on one side. This model constrains the location of the hinge zone of the Ekström Ice Shelf to be about 55 km south of the GvN Station, and verifies the observed vertical displacements at this station. (Auth. mod.)

F-49063

Oerter, H., ed, **Filchner-Ronne Ice Shelf programme, Report No.6 (1992)**, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, 109p., Refs. passim. For individual papers see C-49069, F-49064, F-49066 through F-49068, F-49071 through F-49083, J-49065, J-49070 or 48-234 through 48-253.

DLC G890.F55R47

This report gathers together written summaries of some of the talks presented at the 7th International Workshop of the Filchner-Ronne Ice Shelf Programme (FRISP). The meeting was held at Senden, Germany, on June 25-26, 1992. Preliminary results from the last field season showed that scientific interest in the area is increasing. It is recognized that understanding global climate change requires an understanding of the role played by the oceans in transporting heat around the world. Ocean circulation is greatly influenced by the formation and sinking of bottom waters around Antarctica, especially in the Weddell Sea. Interactions between the Filchner-Ronne Ice Shelf and the underlying water are thought to play a crucial role in helping to create Antarctic Bottom Water, a water component that eventually affects the properties of half the deep water mass in the world ocean. Most talks at the meeting addressed basal processes or interactions with the ocean.

F-49064

Jenkins, A., **Influence of Filchner-Ronne Ice Shelf on the Weddell Sea**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.7-13, 18 refs.

DLC G890.F55R47

The Filchner-Ronne Ice Shelf, which occupies the southern-most embayment of the Weddell Sea, contains the thickest ice ever confirmed as being afloat on the ocean. Interactions between the ice and the underlying seawater occur because a state of thermal disequilibrium exists when ice is in contact with water which is above its freezing point. As the freezing point of water is a function of pressure, a stronger interaction between ocean and ice is to be expected beneath a thicker ice shelf. Hence, the immense thickness of Filchner-Ronne Ice Shelf, combined with a surface area which is second only to that of the Ross Ice Shelf, lend it by far the greatest potential of any ice shelf to influence its oceanic environment. The discussion herein summarizes its impact on the Weddell Sea and focuses on two questions: how much meltwater is discharged into the sea, and at what level in the water column is its influence felt?

F-49066

Blindow, N., Grosfeld, K., Jonas, M., **New results of structural investigations in the central part of the FRIS**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.20-21.

DLC G890.F55R47

Processing and evaluation of the high resolution 40 MHz monopulse soundings in Filchner-Ronne Ice Shelf (1990 field season) have been continued. Some of the profiles were migrated with promising results. An example is shown in a figure. This EMR section downstream of Doake ice rumpled displays folding of internal layers and steplike features in the deepest reflector which is the boundary between meteoric and marine ice. The migrated section shows a much clearer picture by having most of the many diffracted signals focused

to their sources. At the present time, some 300 km of high resolution profiles are processed in the same way. Flowlines were determined from internal structures which could be correlated on parallel profiles.

F-49067

Grosfeld, K., Blindow, N., Thyssen, F., **Bottom melting on FRIS: results from different methods**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.22-25, 7 refs.

DLC G890.F55R47

The bottom melting rate of ice shelves is a significant quantity for mass balance studies, but simultaneously is the least known parameter. It can only be calculated from surface measurements by indirect methods. For different locations close to the ice shelf edge of the Filchner-Ronne Ice Shelf (FRIS), melting rates were derived from Behrendt (1970) to 9 m/a and Kohnen (1982) to 3 m/a. These values show the large variance and the importance of a reliable determination of this quantity. During the 1989/90 field season hot-water drillings were performed to investigate the ice thickness and its variation by temperature and TDR measurements. Re-measurements of the installed chains in 1991/92 yield a direct comparison for the change of the ice shelf bottom over two years.

F-49068

Eicken, H., Oerter, H., Graf, W., **Textural characteristics of the core B13 from the Ronne Ice Shelf and the textural evolution of deforming ice**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.26-29, 7 refs.

DLC G890.F55R47

The texture and physico-chemical properties of an ice core (B13), down to 215 m depth in the Ronne Ice Shelf, have been studied with regard to formation and transformation of the ice. At a depth of 152.8 m a sharp discontinuity marks the transition of meteoric ice accumulated from above and marine ice accreted from below, as testified by conductivity and stable-isotope measurements as well as geophysical field surveys. Visual inspection of the core shows a high concentration of impurities (shown to be in silt/clay size range through petrographic techniques) in the marine ice immediately underlying the boundary zone.

F-49071

Robinson, A.V., Makinson, K., **Preliminary results from hot water drilling and oceanographic measurements under Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.40-46, 6 refs.

DLC G890.F55R47

In a continuation of the study on the interaction between Ronne Ice Shelf and the underlying waters of the southern Weddell Sea, the BAS hot water drill was used in Jan. 1992 to penetrate the ice shelf on the flowline of the Evans Ice Stream. The ice at the drill site was 540 m thick. The site was 200 km from the Ronne ice front and 100 km north of the site drilled in 1991 on the Rutford flowline. The sea floor topography shows that the two sites are separated by a submarine ridge, and that site 90/2 of this study is over the "Ronne depression" which connects through to the cavity beneath Filchner Ice Shelf. This suggests the possibility of different oceanographic regimes at the two sites.

F-49072

Oerter, H., **Filchner IV campaign and the 320 m deep ice core B15**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.47-53, 8 refs.

DLC G890.F55R47

The Filchner IV campaign continued the German program on Mass Balance and Dynamics of the Filchner-Ronne Ice Shelf started in 1980, with the pre-site survey for the German wintering-over base. The core programs of the 1992 field season were either related to the marine shelf ice in the central part of the Ronne Ice Shelf or to the mission of the European Space Agency's satellite ERS-1. This paper deals with the drilling operations, mainly ice-core drilling. The area under investigation in the Filchner IV campaign is shown in a figure.

F-49073

Minikin, A., Kipfstuhl, S., **Preliminary results of the in situ core processing of the new 320 m ice core from the central Filchner-Ronne Ice Shelf: ECM, AC conductivity and density**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.54-60, 9 refs.

DLC G890.F55R47

During the 1991/92 field season a 320 m deep ice core, B15, was recovered from the central Filchner-Ronne Ice Shelf at location D236, about 180 km from the ice edge. The drill site was chosen on a flow line through the former drill site B13 which extends most probably back to the Möller Ice Stream and passes east of Henry Ice Rise. The drilling reached the marine shelf ice layer at a depth of 152.7 m. Here, the authors present first results as derived by various field measurements on the ice cover, including electrical DC conductivity (ECM method), electrical AC conductivities at ten frequencies in the range from 85 Hz to 1 MHz, and quasi-continuous density as measured by gamma absorption.

F-49074

Möller, D., Riedel, B., Ritter, B., **Strain and velocity determination on Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.61-68, 3 refs.

DLC G890.F55R47

Calculations of strain parameters with the help of repeated geodetic distance measurements, and the velocity field values of the Ronne Ice Shelf with GPS data, are described in this paper.

F-49075

Karsten, A., Ritter, B., **Trigonometric leveling 1992 on Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.69-73, 1 ref.

DLC G890.F55R47

Although it is necessary to determine other components of the mass balance and dynamics of ice shelves, geodetic measurements can determine the ice-flow velocity and direction, surface strain-rates, and the height of the ice surface. This report engages with the problem and the results of trigonometric levelling. Motorized trigonometric levelling, adopted first in 1987 on Ekström Ice Shelf by the Braunschweig Group, proved to be a successful method for height determination above sea-level. In the course of four antarctic expeditions, profiles with a total length of approximately 1800 km were levelled.

F-49076

Sturm, K., **Glaciological fieldwork on the Ronne Ice Shelf within the ERS-1 field campaign 1992**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.74-82, 4 refs.

DLC G890.F55R47

Ground-based microwave measurements by means of a Ku-band scatterometer of the Mullard Space Science Laboratory and by a C- and X-band scatterometer/radiometer of the Institute for Meteorology and Geophysics, Innsbruck were supported by detailed glaciological measurements of accumulation and physical properties of snow on the Filchner-Ronne Ice Shelf in 1992. The *in situ* data will be used for interpretation of the microwave signatures measured on the ground and of synthetic aperture radar and altimeter data acquired by the European Space Agency's ERS-1 satellite. The glaciological measurements are presented here.

F-49077

Bamber, J.L., Brown, S., **Analysis of infrared imagery over the Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.83-86, 3 refs.

DLC G890.F55R47

During the austral summer 1991-92 a dual frequency ground-based radiometer, radiosonde equipment and a surface temperature profiler were used on the Ronne Ice Shelf as part of the ERS-1 calibration/validation campaign mounted by the Alfred Wegener Institute. One of the aims of this project was to validate Along Track Scanning Radiometer (ATSR) measurements of physical surface temperature and atmospheric correction models over snow. Some early results of this experiment and an interpretation of ATSR imagery over the ice shelf are described here.

F-49078

Heidland, K., Schenke, H.W., Völksen, C., Seeber, G., **Height reference base of Filchner-Ronne Ice Shelf and Weddell Sea by ERS-1 radar altimetry**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.87-88.

DLC G890.F55R47

During the German *Polarstern* expedition ANT X/2 (Filchner IV) in Jan./Feb. 1992, a height ground-truth reference field was installed 100 km SW of the German Filchner station located on the Ronne Ice Shelf. The measurements will be used for ERS-1 radar altimetry data calibration and validation. The size of the test field is 40 km by 40 km. The position of the center was 78S, 52.8W in the crossing point of the subtracks 13 and 31 of the 3-day orbit of ERS-1. Trigonometric levelling of fiducial height points allows a comparison of ellipsoidal WGS84 and orthometric height differences.

F-49079

Reinhold, A., Sievers, J., **Fieldwork 1991/92 for interferometric SAR data analysis on Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.89-91, 2 refs.

DLC G890.F55R47

The purpose of interferometric synthetic aperture radar (SAR) data analysis for large areas of Antarctica is to produce a digital height model of the snow surface at different times. An ERS-1 satellite mission will be used to investigate systematically the features of the interferometric SAR (INSAR) method. The field work was carried out during the antarctic summer season in Jan. and Feb. 1992 whereby

a reference area (40 km x 40 km) had been established on the Ronne Ice Shelf, with the center point at 78S and 52.8W.

F-49080

Ridley, J.K., Mantripp, D.R., Bamber, J.L., **Results from a validation campaign for the ERS-1 radar altimeter on the Filchner-Ronne Ice Shelf, Antarctica**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.92-97, 2 refs.

DLC G890.F55R47

Satellite radar altimeters, typically operating in the Ku band, are capable of measuring surface heights to an accuracy of 1 m and a precision of 0.4 m; however, it is important to understand the scattering properties of the ice so as to determine the relationship between the apparent radar surface and the true physical surface. A field trip to several locations on the Filchner-Ronne Ice Shelf with two identical Ku band scatterometers had the objective of determining the spatial and temporal variability in the radar characteristics of the ice shelf surface. This data was then compared with the radar altimeter measurements from the simultaneous overflight by the European Remote Sensing Satellite, ERS-1.

F-49081

Holmlund, P., **Radio-echo soundings along the lowermost part of the Bailey Ice Stream in the Filchner Ice Shelf basin**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.98-100.

DLC G890.F55R47

The radar surveys presented here are conducted within the Aurora program on the Filchner Ice Shelf. It is hoped that they will bring additional knowledge about antarctic mass balance. The radio-echo sounder used is a continuous wave step frequency radar system based on a Hewlett-Packard Network analyzer (8753B). The system was developed by the Royal Norwegian Council for Scientific and Industrial Research (NTNF/PFM). The radar transmits 201 frequencies equally spaced over an adjustable frequency and bandwidth from 300 kHz to 3 GHz. In this study, a bandwidth of 5-7 MHz with a center frequency of 173 MHz was used. The radar was pulsed using a range-gate so as to eliminate the direct leakage signal between the antennas.

F-49082

Kristensen, M., **Activities within the Aurora Programme—Field season 1991/92**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.101-102.

DLC G890.F55R47

Activities carried out during the 1991-1992 field season on the Filchner-Ronne Ice Shelf in glaciology, geology, oceanography and meteorology are outlined; ERS-1 calibration work, ice coring, and radar measurements are briefly described.

F-49083

Österhus, S., Orheim, O., **Studies through Jutulgryta, Fimbulisen in the 1991/92 season**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.103-109, 2 refs.

DLC G890.F55R47

A brief summary is given of the work carried out during the 1991-1992 season, part of a long-term program to investigate conditions underneath antarctic ice shelves. During the first stage of this program, sub-ice instruments were deployed at the Fimbul Ice Shelf on Feb. 10, 1990, in a fissure through 11.1 m of solid ice which was underlain by 27 m of slush. The rig contained altogether 39 sensors.

The first data regarding recovery of instruments, ice temperature, water temperature and salinity, current speed and tides, are presented.

F-49088

Hawkins, J.D., May, D.A., Abell, F., Ondrejik, D., **Antarctic tabular iceberg A-24 movement and decay via satellite remote sensing**, International Southern Hemisphere Meteorology and Oceanography Conference, 4th, Hobart, Australia, Mar.-Apr. 1993. Proceedings, Boston, MA, American Meteorological Society, 1993, p.475-476, ADA-265 738, 2 refs.

The unusual track between the Falkland Is. and South Georgia taken by iceberg A-24 was successfully monitored via SSM/I imagery and vis/IR data. The corresponding IR data is of particular interest because of the wealth of mesoscale eddy activity revealed near A-24. Large current shear and SST gradients probably contributed in some degree to the final breakup. (Auth. mod.)

F-49122

Jacobs, S.S., Comiso, J.C., **Recent sea-ice retreat west of the Antarctic Peninsula**, *Geophysical research letters*, June 18, 1993 20(12), p.1171-1174, 27 refs.

Satellite passive microwave data show a record decrease in sea ice extent in the Bellingshausen Sea from mid-1988 through early 1991. The change coincides with more southerly surface winds, increased cyclonic activity and rising surface air temperatures, which reached historic highs along the west coast of the Antarctic Peninsula in 1989. Preceded by high ice cover in 1986-87, the retreat was most evident during summer in the formerly perennial sea-ice field over the continental shelf. Ocean heat storage probably contributed to the persistence and coastal propagation of this anomaly. (Auth.)

F-49154

Romanov, A.A., **Minimum and maximum drift ice extent in the southern ocean in 1991**, *Poliarnye novosti*, Jan. 1992 No.1, p.30-31, Translated from Russian.

The overall pattern of drift ice distribution in the Southern Hemisphere in Sep. 1991 with a relatively small number of large anomalies (positive and negative) permits the consideration of 1991 as a mean year as to ice cover conditions, with practically zero anomaly of the edge position on the whole for the southern ocean. It is also evident that for some regions of the southern ocean, 1991 was a year of maximum development of sea ice and its considerable advance northward as compared with its normal position. (Auth. mod.)

F-49162

Bintanja, R., **Glaciological and meteorological investigations on Ecology Glacier, King George Island, Antarctica (summer 1990-1991)**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.59-71, 10 refs.

In the framework of the first Dutch Antarctic Expedition to Arc-towski Station Dec. 1990-Jan. 1991, one month of glaciological and meteorological measurements were carried out on and near the Ecology Glacier. Measurements show that temperatures were higher than the 10-year mean value for Dec. and Jan. Also, the cloud amount was somewhat higher than normal, with a large share of low clouds with a base height of 100-300 m. The regular occurrence of a relatively warm air layer near the surface of the glacier was striking. During the measuring period, variations in the spectrally integrated albedo of snow caused by variations in cloud cover were important. A model is constructed which calculates the ablation from measured meteorological quantities by explicitly treating physical processes such as longwave radiation, turbulent fluxes, heat conduction in the snow/ice layer, percolation of meltwater and phase changes. It is es-

timated that the annual ablation at an elevation of 100 m is approximately 1.5-2.0 m water equivalent. (Auth. mod.)

F-49188

Blankenship, D.D., Bell, R., **Delving into the west antarctic ice sheet**, *Geotimes*, Aug. 1993 38(8), p.12-15.

An aircraft specially equipped with laser altimeters, ice-penetrating radar, and aeromagnetic and aerogravity systems is the product of a group known as 'CASERTZ' (Corridor Aerogeophysics of the Southern and Eastern Ross Transect Zone). With surveys using this aircraft, the CASERTZ group hopes to be able to map the Ross Ice Sheet to determine if it conforms to the Ross Basin. From this kind of data the group will be able to assess the possibilities/probabilities of a collapse of the West Antarctica Ice Sheet, and, if so, within what time frame.

F-49189

Bindschadler, R.A., **New views for antarctic glaciology**, *Geotimes*, Aug. 1993 38(8), p.16-19.

Because of the instability of the west antarctic ice sheet and the threat of its possible collapse and consequent release of its reservoir of water, it is important to have a remote sensing capability available for continuous monitoring of the ice sheet. A brief view is provided of the ease, precision, frequency, and safety that have accompanied the development of satellite imagery for gathering ice sheet data in the remoteness of Antarctica.

F-49190

Walker, G., **Stopping an ice stream**, *Nature*, Oct. 14, 1993 365(6447), p.608-609.

Four of the five ice streams on the Ross Ice Shelf are flowing as expected. However, Ice Stream C stopped flowing about 130 years ago. As yet, the cause for the blockage has not been determined, although several possibilities have been suggested. Subglacial meltwater or a layer of soft, well lubricated, almost frictionless till seemed likely culprits, but objections to both notions leave the problem still unresolved.

F-49203

Morris, E.E., ed, **Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015**, Cambridge, British Antarctic Survey, 1992, 44p., Refs. passim. For individual papers see 48-780 through 48-785, or F-49204 through F-49206, F-49208, F-49209 and I-49207.

This collection of 6 papers forms an interim report on research undertaken at the British Antarctic Survey (BAS) in support of the project "Climate Change, Sea Level Rise and Associated Impacts in Europe". The aim of the BAS research is to predict the contribution to sea level rise from changes in the volume of ice in the Antarctic Peninsula over the next 100 years.

F-49204

Frolich, R.M., **Surface mass balance of the Antarctic Peninsula ice sheet**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.3-9, 12 refs.

Total surface mass balance on the Antarctic Peninsula ice sheet is estimated to be 294 ± 36 Gt/a for conterminous grounded ice and 491 ± 79 Gt/a for all ice surfaces combined. Equivalent figures for the whole Antarctic of 1572 ± 165 Gt/a and 2144 ± 240 Gt/a are obtained by updating a previous estimate. Major contributors to uncertainty are the sparse dataset, which contains strong temporal and

spatial biases, and the poor parameterization of ablation. Since the ice sheet contributes some 20% to the antarctic surface mass balance (greater than current estimates of the total antarctic imbalance) and lies in a region thought to be particularly sensitive to climate change, improvements to the dataset and to the understanding of climate sensitivity are urgently needed. (Auth.)

F-49205
Peel, D.A., **Spatial temperature and accumulation rate variations in the Antarctic Peninsula**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.11-15, 7 refs.

Current spatial trends in accumulation rate and temperature in the Antarctic Peninsula have been investigated using data obtained from shallow cores. Provisional algorithms linking accumulation rate with temperature and altitude have been computed for each of three zones, which exhibit markedly different characteristics. Generally, it seems that snow accumulation rate closely parallels the mean saturation mixing ratio of water vapor, in line with similar behavior over the continental ice sheet. Accumulation rates at several sites have increased by some 20% since about 1950, in parallel with a typically 1.9 C warming (at Faraday) since 1903, although this increase lies within the range of natural periodic fluctuations. (Auth.)

F-49206
Morris, E.M., Vaughan, D.G., **Snow surface temperatures in West Antarctica**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.17-24, 23 refs.

Snow temperatures measured at around 10 m depth over the period of 1957 to 1992 have been used to derive a map of mean annual surface temperature over the Antarctic Peninsula and Filchner-Ronne Ice Shelf. Linear regression analysis has been used to calculate lapse rates west and east of the topographic divide running along the spine of the Antarctic Peninsula. There is evidence of climatic warming on the Filchner-Ronne Ice Shelf, but elsewhere temporal variability obscures any warming trend. (Auth.)

F-49208
Hindmarsh, R.C.A., **Estimating ice-sheet response to climate change**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.27-34, 17 refs.

Procedures for estimating the likely response of ice-sheets to short-term climate change are given. These give estimates of the magnitude and rate of response, and the sensitivity of changes in divide thickness to changes in climate in the flanking areas. (Auth.)

F-49209
Vaughan, D.G., **Ice shelves on the Antarctic Peninsula: changing climate and sea level**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.35-44, 28 refs.

The recent changes in extent of the ice shelves of the Antarctic Peninsula are reviewed, and the implications for the sea level are discussed in the light of the measured regional warming. Data are presented that imply the disintegration of Wordie Ice Shelf has not

been accompanied by an immediate increase in velocity of the input glaciers. Despite the relatively large component of basal sliding, backpressure from the ice shelf does not appear to have been important in their force balance. Even the complete disintegration of the ice shelves on the Antarctic Peninsula would be thus unlikely to cause a globally significant amount of grounded ice to melt or a noticeable sea level rise. The ice shelves of the Antarctic Peninsula may, however, have a strong influence on regional climate and are certainly robust indicators of climate change. They also provide an excellent training ground to study ice shelves on the move, in preparation for making reliable predictions about the fate of ice shelves further south that stabilize the West Antarctic Ice Sheet. (Auth.)

F-49215
Davis, C.H., **Satellite radar altimetry over the continental ice sheets**, Lawrence, University of Kansas, 1992, 183p., University Microfilms order No.DA9313095, Ph.D. thesis. Refs. p.167-177.

Early indications of a warmer climate in the polar regions are likely to show as increases in surface melting and ice-sheet thinning. Surface elevation data are used to delineate major drainage basins and to monitor changes in the mass balance (volume growth) of the ice sheets. Spaceborne radar altimeters have provided the only proven means for measuring surface elevations with the precision and spatial coverage required for meaningful ice-sheet studies. Surface elevations estimated from a surface/volume retracking algorithm were compared with the surface elevations produced from NASA and ESA retracking algorithms. The NASA retracking algorithm was found to produce surface elevation estimates that were within 33 to 45 cm on average of the surface elevations derived from the surface/volume scattering model. By analyzing several thousand satellite crossover points from the antarctic dataset, the author determined the effect of seasonal variations on the NASA and ESA retracking algorithms. The NASA algorithm produced the most accurate elevation-change when seasonal variations were present; it measured 0.7 to 1.6 m change in elevation over a 6-month period on the East Antarctic plateau where accumulation rates are only 10 cm/year. (Auth. mod.)

F-49222
Vaughan, D.G., Doake, C.S.M., **Use of visible satellite imagery over ice sheets**, TERRA-1: Understanding the terrestrial environment. The role of Earth observations from space. Edited by P.M. Mather, London, U.K., Taylor and Francis, 1992, p.9-20, Refs. p.19-20.

After a discussion of satellite sensors, including technical considerations, uses of imagery, interpretation of ice dynamics, and augmentation of visible imagery, the authors conclude that despite the tremendous advances in other types of satellite sensors over the past decade, visible imagery will remain the most valuable source of data on the structure and dynamic behavior of the polar ice sheets. The complete potential of satellite data will, however, only be achieved by integrated interpretation of data from the complete armory of sensors, together with ground truth whenever it is available.

F-49247
Toh, H., Shibuya, K., **Thinning rate of ice sheet on Mizuho Plateau, East Antarctica, determined by GPS differential positioning**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.579-583, 9 refs.

Two sets of GPS receivers were used in Jan. 1988 in order to conduct differential positioning of stations on the Mizuho route relative to the astronomical point at Showa Station. Noise sources common to each station in satellite positioning are easily cancelled out, resulting in an elevation accuracy within 0.3 m. Simultaneous gravity measurements were also made using a LaCoste- Romberg Gravimeter

G-515 at each differential positioning site. The positions of 11 stations were determined through this method and compared with those observed in Oct. 1980 after appropriate coordinate conversion, referred to WGS84 Ellipsoid since 3 stations observed in 1980 were repeated in 1988. Although a different positioning system (NNSS) had been used in 1980, which yielded more erroneous positions than those of GPS, direct comparison of the heights yielded the thinning rates of ice sheet at the 3 stations as 0.57, 0.20 and 0.53 m/y, respectively. A comparison of these results with the simultaneous gravity measurements showed that the thinning rate of ice sheets coincided well with the gravitational secular change caused by the height change at station Z33. The basal sliding velocity at station Z33 was also estimated as 11.9 m/y using the thinning rate above and assuming the inclination of the bedrock as of the order of 0.01. (Auth.)

F-49297

Granberg, H.B., Leppäranta, M., **Observations of sea ice ridging in the Weddell Sea**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.235-240, 16 refs.

Sea ice ridging has generally been assumed to be less intensive in the seas surrounding the antarctic continent than in the Arctic Ocean. This assumption, which is based on the divergent nature of the antarctic sea ice, is supported by previous measurements in the Ross Sea and in the eastern Weddell Sea. To further test this assumption, helicopterborne laser profile measurements were made in the area near 72 deg S, 28 deg W as part of the sea ice research program of the First Finnish Antarctic Expedition (FINNARP 1989). Measurements show that ice ridging conditions in this area are similar to those observed in the Arctic. (Auth. mod.)

F-49298

Inanaga, A., **MOS-1/MSR mosaic data sets**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.241-246, In Japanese with English summary. 5 refs.

MOS-1 (Marine Observation Satellite) data sets of the Okhotsk Sea and Antarctica were produced as a part of the Japanese contribution to ISY/PIE (International Space Year/Polar Ice Extent). The MSR (Microwave Scanning Radiometer) of MOS-1 scans with 2 frequencies, 23.8 GHz and 31.4 GHz. Microwaves pass through the atmosphere better than visible light and infrared radiation; those around 30 GHz are useful for observation of sea ice. In the Antarctic, sea ice extended beyond 60S in Sep., and its north edge moved back near the coast line of Antarctica in Mar. In order to observe the concentration of sea ice, areas with high brightness temperature were regarded as areas where ice concentrated densely. Those areas appeared on the sea off Cape Ann in Sep., and on the sea around Lützow-Holm Bay in the other seasons. The size of these areas became largest in Nov., which was not the same as the time of largest sea ice extent. (Auth. mod.)

F-49299

Takizawa, T., **Thermal structure of the Cosmonaut Polynya region in the Antarctic**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.247-250.

A row of polynyas has been observed by satellite in the spring and summer since 1973 around 66S, 45E in the Cosmonaut Sea. XBT (expendable bathythermograph) and satellite observations conducted by the Japanese Antarctic Climate Research program in the summers of 1990-91 and 1991-92 indicate that Circumpolar Deep Water (CDW) in the region is found below a depth of about 150 m, east and

west of a cold water mass of temperature below -1.5 C that appears to correspond with a bank that extends from the continental shelf to offshore over 45-50E. The row of polynyas is located between the CDW and the cold water mass, particularly to the west of the bank. Because the Antarctic Divergence Line runs near the row, upward transport of heat along the Divergence Line may be responsible for the formation and maintenance of the row of polynyas.

F-49301

Nishio, F., Cho, K., Seko, K., **Disintegrating ice front of Shirase Glacier, East Antarctica**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.256-260, 8 refs.

The front of the Shirase Glacier floating ice tongue has been observed since 1957. The tongue was longest in 1961 when it extended about 70 km. It shrunk to the mouth of the Shirase Glacier three times: in the mid 60's, in 1980, and in Jan. 1988. There were some periods of growth in 1981, 1984, and 1989. As of Jan. 1991, there was no ice tongue. The Shirase Glacier is one of the fastest flowing glaciers in Antarctica with a velocity of about 2.5 km/yr at its mouth.

F-49307

Isaksson, E., **Spatial and temporal patterns in snow accumulation and oxygen isotopes, western Dronning Maud Land, Antarctica**, Orono, University of Maine, 1991, 203p., M.Sc. thesis. 110 refs.

During the Swedish Antarctic Expedition to Dronning Maud Land in 1988-89, the surface mass balance for the previous 15-30 years was estimated by using stake measurements and firn cores. Oxygen isotope stratigraphy was used to calculate the interannual variability in surface accumulation rate for that period. The results suggest that both the spatial and temporal variability in surface accumulation are large over short distances. Despite this variability, the stacked accumulation record correlates well with mean annual temperature from nearby Halley Station. The *delta*O-18 record from cores on the ice shelf and the escarpment area, below 2000 m a.s.l., shows high variability and little year-to-year correspondence to the temperature record from Halley; this indicates that other factors in addition to temperature are responsible for the *delta*O-18 distribution. However, the 3-year running mean reveals more similarities between the Halley temperature record and the stacked *delta*O-18 record. The well-developed *delta*O-18 stratigraphy in the cores from this area makes it promising for future work with ice cores as paleoclimatic records. (Auth.)

F-49311

Grosfeld, K., **Investigations on temperature regime and mass balance of the Filchner-Ronne Ice Shelf, Antarctica, with special emphasis on melting and freezing processes** [Untersuchungen zu Temperaturregime und Massenhaushalt des Filchner-Ronne-Schelfeises, Antarktis, unter besonderer Berücksichtigung von Anfrier- und Abschmelzprozessen], *Berichte zur Polarforschung*, 1993 No.130, 149p., In German with English summary. Refs. p.135-145. This work is the printed version of a Ph.D. thesis submitted to the Faculty of Sciences, Westfälische Wilhelms-Universität Münster, Nov. 1992.

This thesis mainly addresses the temperature-depth profile and mass balance of ice shelves, especially of the Filchner/Ronne Ice Shelves. Ice shelves represent the main drainage basins of the antarctic ice cap and are sensitive indicators of climate induced mass-balance changes in Antarctica. In addition the central part of the Filchner/Ronne Ice Shelves consists of meteoric and a layer of marine ice

with thicknesses of up to 400 m, which accumulates from the ocean underneath the ice shelf by crystallization processes. This layer contributes to the mass budget of the ice shelf and influences the temperature regime significantly. During the German Antarctic field season 1989-90 (ANT VIII/5) special interest was focussed on the examination of the temperature-depth profile, ice thickness and bottom melting by means of hot-water drillings. The drillholes were located at 77S and 52.3W, about 30 km shoreward of the ice front. The installation of temperature chains inside the drillholes down to the sea-water beneath yielded data on the temperature-depth profile, ice thickness and its variation, and sea-water temperature. On the basis of heat conduction theory, a two-dimensional thermal ice shelf model was developed, using thermal properties that depend on temperature and salinity to simulate the influence of the freezing process of basal marine ice on the temperature profile. The model results show a strong influence of basal accretion on the temperature field in the central part. (Auth. mod.)

F-49323

Warren, S.G., **Correction to "Green icebergs formed by freezing of organic- rich seawater to the base of antarctic ice shelves"** by S.G. Warren et al, *Journal of geophysical research*, Oct. 15, 1993 98(C10), p.18,309, 1 ref. For pertinent paper see 47-4138 or F-48536.

This note presents authors' corrections to a prior paper available under bibliographic designations 47-4138 or F-48536.

F-49324

Barber, M., Brown, R.L., **Theoretical and experimental results of using binders for snow roads and runways in Antarctica**, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, July 1993 SR 93-17, International Conference on Winter Vehicle Mobility, 1st, Santa Barbara, CA, June 1991. Proceedings. Edited by G.L. Blaisdell, p.113-124, ADA-271 546, 18 refs.

The consequences of adding wood as a binder material to snow are discussed in this paper. A modified mixture theory, based upon volume fraction, is proposed. Field and laboratory experiments conducted in the laboratory using a 50k MTS press with a cold chamber are presented. The laboratory samples were allowed to sinter and then compressed at two different strain rates. This laboratory data suggests the suitability of binders to strengthen the snow matrix. Mixtures of wood/snow pavement test sections were constructed in the Antarctic at McMurdo and Amundsen-Scott Stations. Test sections were monitored for three months during the austral summer and tested again a year later. Rammsonde penetrometer, density and temperature profiles were used to evaluate material behavior. Field results indicate that snow pavement strength depends upon temperature history, initial material properties, and construction processing techniques. Satisfactory strengths for supporting wheeled aircraft were obtained at depths below 20 cm at both stations. Field evidence shows that with an improved surface processing technique, such as heat processing, adequate strength may be obtained to support wheeled aircraft landing in the Antarctic. (Auth.)

F-49356

Davis, C.H., **Surface and volume scattering retracking algorithm for ice sheet satellite altimetry**, *IEEE transactions on geoscience and remote sensing*, July 1993 31(4), p.811-818, Presented at the 12 International Geoscience and Remote Sensing Symposium, Houston, TX, May 26-29, 1992. 22 refs.

This paper presents an algorithm based upon a combined surface and volume scattering model that is used to retrack individual altimeter waveforms from ice sheets including one at Wilkes Land, East Antarctica. This retracking algorithm can be used to assess the ac-

curacy of elevations produced by current retracking algorithms, which do not account for subsurface volume scattering. This facilitates the use of repeated altimeter elevation measurements for accurate detection of changes in the mass balance of the ice sheets. In addition, by analyzing the distribution of the model parameters over large portions of the ice sheet, quantitative estimates of regional and seasonal variations in the near-surface properties of the ice sheets can be obtained. (Auth. mod.)

F-49357

Suttie, E.D., Wolff, E.W., **Local deposition of heavy metal emissions from point sources in Antarctica**, *Atmospheric environment*, Aug. 1993 27A(12), p.1833-1841, 18 refs.

Surface snow samples have been analyzed for the heavy metals Cd, Cu, Pb and Zn to investigate the spatial scale of local sources of pollution in Antarctica. Samples from around an isolated petrol generator showed vastly increased levels (up to 800,000 times background) directly under the exhaust. Concentrations fell sharply with distance from the exhaust, reaching background levels at 40 m, even in the downwind direction. Snow was also collected at various distances from a manned scientific station. These data are more difficult to interpret, but the influence of the station could not be detected beyond 10 km. The findings indicate the areas that are influenced by local emissions, and that are therefore unsuitable for air and snow sampling intended to study larger-scale pollution input. (Auth.)

F-49385

Gloersen, P., **Arctic and antarctic sea ice, 1978-1987: satellite passive- microwave observations and analysis**, *U.S. National Aeronautics and Space Administration. Special publication*, 1992 NASA SP-511, 290p., Refs. p.213-223.

Arctic and antarctic sea ice was observed by a Scanning Multichannel Microwave Radiometer (SMMR) on board the polar orbiting Nimbus 7 satellite from Oct. 26, 1978 through Aug. 20, 1987. During the observation period, the area of sea ice varied on the average in the Arctic from a minimum of 9 million sq km in Sep. to a maximum of 16 million sq km in Mar., and in the Antarctic from a minimum of 3.5 million sq km in Feb. to a maximum of 19 million sq km in Sep. A negative trend of 2.1% as observed in the arctic sea ice extent but no trend was observed in the Antarctic. The Weddell Polynya, which had persisted throughout three of four austral winters in 1973-1976, was absent. Maps showing the mean monthly sea ice concentrations, mean monthly sea ice concentration anomalies, and mean monthly sea ice temperatures for both the Arctic and Antarctic are included.

F-49403

International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992, Steffen, K., ed, **Proceedings, Annals of glaciology**, 1993 Vol.17, 434p., Refs. passim. For individual paper see 48-1293 through 48-1357 or F-49404 through F-49429.

The third symposium on Remote Sensing of Snow and Ice, organized by the International Glaciological Society, took place in Boulder, CO, May 17-22, 1992. The 7 topics discussed include cloud masking, ice surface temperature, narrow-band albedo, ice concentration, lead statistics, sea-ice motion and ice-sheet studies with specifics on applications, algorithms and accuracy, following recommendations for future improvements. In general, the results of the symposium affirmed the strong potential of AVHRR (Advanced Very High Resolution Radiometry) for studying sea ice and snow covered surfaces, and use of this satellite data set for long-term monitoring of polar process studies is recommended. However, progress is needed to reduce the uncertainty of the retrieved parameters for all of the above mentioned topics to make this data set useful for direct climate applications such as heat balance studies and others. Further, the acquisition and proc-

essing of polar AVHRR data must become better coordinated among receiving stations, data centers and funding agencies to guarantee a long-term commitment to the collection and distribution of high quality data. (Auth. mod.)

F-49404

Steffen, K., Bindshadler, R.A., Casassa, G., Comiso, J.C., Eppler, D., Fetterer, F.M., Hawkins, J.D., Key, J., Rothrock, D., Thomas, R., Weaver, R., Welch, R., **Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992**, *Annals of glaciology*, MP 3344, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.1-16, 62 refs.

This paper summarizes the ideas and recommendations from the 3rd International Symposium on Remote Sensing of Snow and Ice, which took place at Boulder, CO, May 17-22, 1992.

F-49405

Winther, J.G., **Studies of snow surface characteristics by Landsat TM in Dronning Maud Land, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.27-34, 14 refs.

Large-scale melting phenomena like meltwater drainage channels and meltwater accumulation basins or frozen lakes have been surveyed on the land ice mass in Queen Maud Land. These melting features were also detected in a Landsat Thematic Mapper (TM) image recorded on Feb. 12, 1990. Image processing techniques such as principal component analysis, band ratioing and histogram-equalizing are carried out to emphasize the melting phenomena. Interestingly, a histogram-equalized single TM Band 5 image appears to be a good discriminator, leaving the melting phenomena as bright areas in the TM scene. The largest frozen lake is close to 1 km wide, while some of the drainage channels stretch more than 5 km. There is also a comparison of satellite-derived and *in situ* reflectance and temperature. The atmospheric corrected satellite data underestimate surface snow albedo by about 16%, while TM measurements of surface temperature are 2 to 6 C lower than those measured on the ground. (Auth. mod.)

F-49406

Pattyn, F., Decler, H., **Satellite monitoring of ice and snow conditions in the Sør Rondane Mountains, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.41-48, 14 refs.

Six multispectral SPOT images and one Landsat Thematic Mapper image of the central part of the Sør Rondane Mountains were obtained over a five year period (1986-90) and studied for their potential in mapping the glacierized surface. From the thermal IR reflectances of Landsat TM a map of ice and snow temperatures was obtained, reflecting large-scale topography. The middle-IR and near-IR bands (in descending order of importance) enhance markedly the variations on the snow surface itself. From multispectral SPOT imagery a glacio-morphological map was created. Some aspects of this map are discussed with respect to the significance of the ablation in this isolated mountain area, where the main ice stream is diverted around the range. Finally, an analysis of multitemporal images led to the development of a classification tool to quantify the extent of ablation and accumulation areas. (Auth. mod.)

F-49407

Seko, K., Furukawa, T., Nishio, F., Watanabe, O., **Undulating topography on the antarctic ice sheet revealed by NOAA AVHRR images**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.55-62, 23 refs.

Undulating topography on the East Antarctic ice sheet was clearly revealed by NOAA AVHRR. Three patterns of undulating topography were detected by using high-pass filtered images from the visible to thermal infrared channels. In coastal regions (below 2000 m a.s.l.), undulation can be clearly detected by the fluctuation of reflectance in the visible channel. It has a wavy structure with spacing less than 10 km and alignment at a right angle to the ice-flow lines. In the katabatic zone (from 1000 m a.s.l. to 3000 m a.s.l.), well-defined fluctuations of albedo spectrum can be seen, with spacing from 10 km to 20 km, aligned at right angles to the ice-flow lines or prevailing katabatic wind direction. Ground-survey data show that the undulating topography is associated with large variations of net accumulation rate. On the inland plateau (over 3000 m a.s.l.), undulation can be clearly seen in the fluctuation of the thermal infrared channel in winter. Ground-survey data show that the signal corresponds to the undulating topography. The alignment of the undulation is at a right angle to the ice-flow lines and the spacing is greater than 20 km. The characteristics of these undulations represent the ice-flow dynamics and accumulation anomaly. (Auth. mod.)

F-49408

Frezzotti, M., **Glaciological study in Terra Nova Bay, Antarctica, inferred from remote sensing analysis**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.63-71, 31 refs.

Analysis of satellite images (Landsat 1 MSS, 4 TM and SPOT 1 XS), of U.S. Navy aerial photographs and of U.S.G.S. maps has made it possible to assess a number of parameters relating to the surface dynamics (between 1956 and 1990) of 8 ice tongues and of 2 ice shelves in the Terra Nova Bay area. The study shows that between 1960-63 and 1972-73 there was a decided decrease in the areas of some of the tongues and shelves: -53 sq km for the Aviator Glacier Tongue and -124 sq km for the Nansen Ice Sheet. On the other hand, the areas generally increased in the period 1972-73 to 1988. An exception to this situation is the small Hells Gate ice shelf, whose area diminished by 1.15 sq km between 1956-57 and 1988. Integration of the areal values with radio-echo sounding data has enabled the ice discharges of the southern flow of the David Glacier (12 cu km/a) and of the Aviator Glacier Tongue (0.62 cu km/a) to be calculated. Furthermore, on the basis of the data available, basal melting values of between 25 cm/a and 100 cm/a are deduced for these two ice tongues, and bottom freezing values of 20 cm/a for the Drygalski Ice Tongue. Different spectral responses of the glacial areas have made it possible to discriminate ablation areas from those of accumulation, and to differentiate various types of ice (glacier ice, lake melt ice, and sea ice formed at the ice shelf-ocean interface). (Auth. mod.)

F-49409

Herzfeld, U.C., Lingle, C.S., Lee, L.H., **Geostatistical evaluation of satellite radar altimetry for high-resolution mapping of Lambert Glacier, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.77-85, 25 refs.

The potential of satellite radar altimetry for high-resolution mapping of antarctic ice streams is evaluated, using retracked and slope-corrected data from the Lambert Glacier and Amery Ice Shelf area acquired by Geosat during the Exact Repeat Mission (ERM), 1986-

89. The map area includes lower Lambert Glacier north of 72.18S, the southern Amery Ice Shelf, and the grounded inland ice sheet on both sides. The Geosat ERM altimetry is found to provide substantially more complete coverage than the 1978 Seasat altimetry, due to improved tracking. The spatial structure in the data is quantified by constructing experimental variograms using altimetry from the area of the grounding of Lambert Glacier, which is the area chiefly of interest in this topographically complex region. The unsmoothed along-track Geosat ERM altimetry yields spatially continuous maps showing the main topographic features of lower Lambert Glacier, upper Amery Ice Shelf and the adjacent inland ice sheet. The probable position of the grounding line of Lambert Glacier is identified from a break in slope at the grounded ice/floating ice transition. (Auth. mod.)

F-49410

Bourdelle, B., Fily, M., **Snow grain-size determination from Landsat imagery over Terre Adélie, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.86-92, 12 refs.

A Landsat Thematic Mapper scene over Adélie Land is used to estimate snow cover grain-size. New calibration coefficients are computed for the TM scene using sea-water reflectance. Topographic effects are corrected with the visible band TM2. Atmospheric effects are taken into account. The snow theoretical reflectance is calculated with the Wiscombe and Warren model. Estimated snow grain-sizes are similar to those given in the literature. (Auth. mod.)

F-49411

Wilson, J.D., Jezek, K.C., **Co-registration of an antarctic digital elevation model with SSM/1 brightness temperatures**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.93-97, 8 refs.

The Special Sensor Microwave/Imager instrument provides daily measures of microwave brightness temperatures (Tb) over the polar regions. Data are available from 1987 to the present and have a demonstrated utility for sea-ice studies. This paper investigates applications to polar ice sheets with a view towards correlating patterns of Tb with ice-sheet elevation, and discusses the Tb signature of processes linked to temperature anomalies and accumulation zone boundaries. (Auth. mod.)

F-49412

Jezek, K.C., Merry, C.J., Cavalieri, D.J., **Comparison of SMMR and SSM/I passive microwave data collected over Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.131-136, 12 refs.

Spaceborne data are becoming sufficiently extensive spatially and sufficiently lengthy over time to provide important gauges of global change. There is a potentially long record of microwave brightness temperature from NASA's Scanning Multichannel Microwave Radiometer (SMMR), followed by the Navy's Special Sensor Microwave Imager (SSM/I). Thus it is natural to combine data from successive satellite programs into a single long record. This paper compares brightness temperature data collected during the brief overlap period (July 7-Aug. 20, 1987) of SMMR and SSM/I. Only data collected over the antarctic ice sheet are used, which limits spatial and temporal complications associated with the open ocean and sea ice. Linear regressions are computed from scatter plots of complementary pairs of channels from each sensor, revealing highly correlated data sets. This suggests the argument that there are important relative calibra-

tion differences between the two instruments. The calibration scheme was applied to a set of average monthly brightness temperatures for a sector of East Antarctica. (Auth. mod.)

F-49413

Gloersen, P., **Satellite passive microwave observations and analysis of arctic and antarctic sea ice, 1978-1987**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.149-164, 6 refs.

This paper examines in detail the spatial and temporal variations in global sea-ice coverage from Oct. 26, 1978 through Aug. 20, 1987. The sea-ice measurements analyzed are derived from data collected by a multispectral dual-polarized constant incidence-angle microwave imager, the Scanning Multichannel Microwave Radiometer (SMMR) on board the NASA Nimbus 7 satellite. The characteristics of the SMMR have permitted a more accurate calculation of total sea-ice concentrations (fraction of ocean area covered by sea ice) than earlier single-channel instruments and, for the first time, a determination of both multiyear sea-ice concentrations and physical temperatures of the sea-ice pack. An estimate of the SMMR wintertime total ice concentration accuracy within 7% in both hemispheres has been obtained. As this is an improvement over the estimated accuracies of previous microwave sensors, improved calculations of the sea-ice extents (areas enclosed by the 15% ice concentration boundaries), sea-ice concentrations, and open-water areas within the ice margins are presented. (Auth. mod.)

F-49414

Surdyk, S., Fily, M., **Comparison of the passive microwave spectral signature of the antarctic ice sheet with ground traverse data**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.161-166, 10 refs.

SMMR (Scanning Multichannel Microwave Radiometer) data are compared with the snow characteristics measured during several traverses over Antarctica, including average density over 0-2 m, 10 m temperature, grain size distributions and number of strata. First a local study of specified areas and then a global study show some strong dependence between satellite data and ground data. The polarization ratios are affected by the stratification of snow (number and nature of layers); large polarization ratios correspond to strong stratification, mainly for the lower frequencies. Because low density induces strong stratification, there is also a dependence between polarization ratios and density even if the density is not the critical factor. The gradient ratios are linked to the grain sizes as determined from detailed stratigraphies; the larger the grain size, the smaller is the gradient ratio between 6.6 and 18 GHz. (Auth. mod.)

F-49415

Scambos, T.A., Bindshadler, R.A., **Complex ice stream flow revealed by sequential satellite imagery**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.177-182, 12 refs.

The velocity field of the confluence area of two large ice stream tributaries forming Ice Stream D in West Antarctica is studied using sequential Landsat images. Correlations among the surface morphology, the velocity field, and the strain-rate field of Ice Stream D reveal a number of important characteristics of ice stream flow: the characteristic flowband appearance of streaming ice is present at velocities from below 100 m/a to above 350 m/a; in the upstream areas there appears to be no sharp transition between "sheet" flow, typical of the surrounding ice sheet, and "streaming" flow; the fastest moving portions of the ice stream are nearly devoid of surface topography

undulations; the confluence area is characterized by acceleration of the ice in the slower tributary as it impinges on faster-moving ice, and by highly convergent flow. Velocity in the faster-moving tributary changes little, and there is no persistent evidence of shear margins of the joined tributaries downstream of the confluence. This study demonstrates that sequential satellite image analysis, coupled with computer-determined displacement measurements, can provide accurate velocity and strain-rate information on a regional scale, rapidly and cost-effectively. Such data sets are required for modelling ice sheet evolution, and for monitoring any changes in ice flow within the ice streams. (Auth. mod.)

F-49416

Ridley, J.K., **Climate signals from SSM/I observations of marginal ice shelves**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.189-194, 9 refs.

A time series of satellite passive microwave observations by the Special Sensor Microwave/Imager (SSM/I) instrument of the antarctic marginal ice shelves reveals sharp transitions in the radiometric brightness temperatures at 19 and 37 GHz. These transitions, sometimes occurring over the period of a single day, indicate the onset of surface melting of the ice. Monitoring the day of the onset of melting and the permanent re-freezing will be a measure of rising air temperatures as a result of global warming. The response from a stable ice shelf, the Ronne, where no appreciable melting occurs, is compared with observations from the marginal ice shelves on the Antarctic Peninsula. The spectral gradient is found to vary as a function of time on a clear annual cycle. It is shown that variations in the spectral gradient arise due both to the temperature profile within the snow and to the dielectric effects of a wet surface layer. (Auth. mod.)

F-49417

Remy, F., Minster, J.F., **Precise altimetric topography in ice-sheet flow studies**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.195-200, 20 refs.

The precision of radar altimetry above an ice sheet can improve glaciological studies such as mass balance surveys or ice-sheet flow models, the first by comparing altimetric data at different times, the second by testing or constraining models with data. This paper is a first step towards the latter. From a precise topography deduced by inversion of altimetric data (Remy et al. 1989), ice-flow direction, balance velocity and basal shear stress are calculated. The rheological parameters involved in the relation linking velocity, stress and temperature are then derived by least-squares regression. (Auth. mod.)

F-49418

Vaughan, D.G., Mantripp, D.R., Sievers, J., Doake, C.S.M., **Synthesis of remote sensing data on Wilkins Ice Shelf, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.211-218, 20 refs.

Compared with the other ice shelves on the Antarctic Peninsula, few surface glaciological data have been collected on Wilkins Ice Shelf. This paper compares, contrasts and combines a variety of remotely sensed data: the recently declassified GEOSAT Geodetic Mission altimetry, Landsat MSS and TM imagery, and radio-echo sounding data, to study its structure and mass balance regime. It is found that this shelf has an unusual mass balance regime and relies heavily for sustenance on *in situ* accumulation. Its response to a continued atmospheric warming may be significantly different from that of Wordie Ice Shelf, which was fed by several dynamic outlet glaciers

that accelerated the disintegration process when the ice shelf fractured. Wilkins Ice Shelf by contrast is almost stagnant, and is expected to respond by normal calving at the ice front. Changes in the accumulation rate or basal melt-rate may, however, dominate any dynamic effect. Over the last two decades the ice front positions have remained stable. (Auth. mod.)

F-49419

Ferrigno, J.G., **Velocity measurements and changes in position of Thwaites Glacier/iceberg tongue from aerial photography, Landsat images and NOAA AVHRR data**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.239-244, 13 refs.

Remote digital velocity measurements were made on Thwaites Glacier on the antarctic coastline, using sequential Landsat images to try to determine if changes in velocity had occurred in conjunction with the changes in ice position. Measurements on Landsat images from 1972 and 1984 revealed an average annual velocity of 2.62 km/yr during that period, and measurements on images from 1984 and 1990 an average annual velocity of 2.84 km/yr, an increase of more than 8%. Estimates made on Thwaites Glacier by others using earlier data contained enough uncertainty that it was impossible to determine a velocity profile over a longer period of time. Examination of the morphology of the glacier/iceberg tongue showed no evidence of surge activity. (Auth. mod.)

F-49420

Casassa, G., Brecher, H.H., **Relief and decay of flow stripes on Byrd Glacier, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.255-261, 9 refs.

Aerial photographs of Byrd Glacier (Brecher, 1986) are used to determine photogrammetrically the relief associated with flow stripes on two transverse profiles separated by a distance of 65 km. Two kinds of stripes are found, topographic and textural flow stripes. Topographic flow stripes are associated with a ridge- trough topography with double amplitudes of 7 m to 45 m and slopes of 1-7%. The valleys of the topographic flow stripes appear bright in the photographs and correspond to snow-covered areas, while ridges appear in general as dark stripes that correspond to bare ice areas with abundant crevasses. Textural flow stripes correspond to bands of distinct crevasse pattern which are not associated with topography. The photogrammetric information is correlated with the brightness pattern across flow stripes that appears on Advanced Very High Resolution Radiometer (AVHRR) data. Flow stripes decay rapidly on the AVHRR imagery over the first 40 km downstream from Byrd Glacier and some persist for nearly 400 km to the front of the Ross Ice Shelf. Velocity was measured across a transect on the upstream photogrammetric profile. There are no velocity discontinuities across the boundaries of flow stripes, which shows that lateral shear between flow stripes is not a valid mechanism for explaining their persistence. (Auth. mod.)

F-49421

Jacobel, R.W., Bindshadler, R.A., **Radar studies at the mouths of ice streams D and E, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.262-268, 13 refs.

Ice thickness measurements have been carried out at the mouths of ice streams D and E, West Antarctica, using a surface-based impulse radar. These studies have been undertaken as a part of the continuing effort to understand the state of the West Antarctica ice sheet and its response to climate change. Thickness measurements will be used in the mass balance calculation currently in progress and to better

understand features in the surface topography seen at low angle sun illumination in the satellite imagery. Results show that the discharge areas of ice streams D and E are thickening by approximately 1 m per year, and thus that these ice streams are probably losing mass. Aperiodic wavelike features in the surface topography are described which pose interesting questions about migration of the grounding line and ice-stream dynamics. (Auth. mod.)

F-49422

Fujita, S., Mae, S., **Relation between ice sheet internal radio-echo reflections and ice fabric at Mizuho Station, Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.269-275, 16 refs.

The relationship between ice fabric and the internal radar reflections was investigated using observation data collected at Mizuho Station. The data were obtained by 179 MHz radar sounding and the ice fabric was measured from a 700 m Mizuho ice core. The dielectric permittivity tensor at given depths in the ice sheet was calculated from the ice fabric. The calculated dielectric permittivity tensor showed that the ice sheet at Mizuho Station is a uniaxially birefringent medium. The symmetrical axis of rotation was the same as the flow line. In such a medium, theory predicts that the electric field vectors are allowed only in the directions parallel and perpendicular to the flow line. The prediction coincided well with the observation: a strong signal was observed only when the transmitting antenna and the receiving antenna, kept parallel to one another, were oriented parallel or perpendicular to the flow line. However, the observed signal strength in these two directions differed from one another at each depth. It is also shown that the power reflection coefficient due to the variation of ice fabric with depth is of approximately the same order as that due to the density change and is large enough to produce the predominant internal radar reflections. (Auth. mod.)

F-49423

Van der Veen, C.J., Jezek, K.C., **Seasonal variations in brightness temperature for central Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.300-306, 13 refs.

The radiative transfer model developed by Zwally (1977) is modified and coupled to a one-dimensional time-dependent temperature model, to calculate the seasonal variation in brightness temperature of a region of the antarctic ice sheet. By comparing this with observed records, the radiative properties of firn can be determined. By retaining scattering as a source term in the radiative transfer function, agreement between model-derived scattering and absorption coefficients and those calculated from the Mie/Rayleigh scattering theory can be obtained. The horizontal brightness temperature is not linked to the vertical one through a constant power reflection coefficient. (Auth. mod.)

F-49424

Holmlund, P., **Interpretation of basal ice conditions from radio-echo soundings in the eastern Heimefrontfjella and the southern Vestfjella mountain ranges, East Antarctica**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.312-316, 15 refs.

Differences in radar echoes received from the base of the ice sheet covering two different mountain areas in Queen Maud Land are here interpreted as differences in the physical properties of the ice and differences in basal conditions. An abnormally strong signal can be caused either by unusually low absorption of radio waves within the ice or by water at the base of the glacier. One of the areas studied

is totally covered by a 400-1400 m thick ice sheet. The altitude of the surface is about 2800 m a.s.l. The second area is a nunatak area situated closer to the coast. The ice thickness in the valleys is about 500 m and the altitude of the surface is about 400 m. The annual mean surface temperature for the areas is about -30 and -17 C respectively. In both cases ice depths are moderate and flow rates low, and it is thus probable that the ice is frozen to the bed. In the colder locality it is likely that the strong echo is caused by low or negligible rate of mass flux. In the lower area, strong bottom echoes are believed to indicate negative mass balance at the surface of the blue ice areas. The negative surface mass balance reverses the vertical component of ice flow and it also changes the temperature distribution within the ice. Basal melting conditions may thus occur at locations where the ablation rate is high. This process may also have important implications for the development of land forms under cold ice sheets. (Auth. mod.)

F-49425

Skvarca, P., **Fast recession of the northern Larsen Ice Shelf monitored by space images**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.317-321, 9 refs.

The rapid retreat and disintegration of the Larsen Ice Shelf sector extending north of Seal Nunataks (65S), documented since the mid 1970s by remote sensing, is presented and related to the Antarctic Peninsula climatic warming recorded over several past decades. A 1975 Kosmos satellite photograph and a series of Landsat MSS and TM images taken in 1978, 1979, 1986, 1988 and 1989 were used to monitor the retreat of the ice shelf between Seal Nunataks and Prince Gustav Channel. The ice shelf has decreased by more than 30% during the period 1975-89 within the Christensen I. to Cape Longing region. Measurements of the ice front position carried out in the field during late 1991 indicate that the recession between Lindenberg I. and Sobral Peninsula is still continuing, in some places at a rate of up to 2.5 km/yr. (Auth. mod.)

F-49426

Rott, H., Sturm, K., Miller, H., **Active and passive microwave signatures of antarctic firn by means of field measurements and satellite data**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.337-343, 18 refs.

The angular dependence and polarization behavior of backscattering and emission of polar firn at 5.2 and 10.3 GHz were measured during an oversnow traverse in Queen Maud Land. The signatures emphasize the importance of snow stratification in the interpretation of microwave remote sensing measurements. Highest backscattering coefficients and little angular variations were observed for refrozen firn near the coast. In permanently dry snow, areas with high accumulation rates and homogeneous snow morphology showed low backscattering coefficients and high emissivities. Pronounced layering and related density variations in low accumulation zones resulted in increased polarization differences of brightness temperatures and increased like-polarized backscattering coefficients. This behavior is confirmed by analysis of C-band scatterometer measurements of the Active Microwave Instrument aboard the European Space Agency's ERS-1. (Auth. mod.)

F-49427

Burns, B.A., **Comparison of SSM/I ice-concentration algorithms for the Weddell Sea**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.344-350, 10 refs.

Four different algorithms for retrieving ice concentration from passive microwave imagery are applied to SSM/I (Special Sensor Microwave Imager) data collected over the Weddell Sea in Sep. 1989. Comparison of the results along a typical transect from the ice edge to the coast shows point-wise differences of up to 45% in ice concentration. The observed differences can largely be explained by the different combinations of the 19 and 37 GHz horizontal and vertical polarization data channels used by each algorithm. Through their frequency/polarization signatures, and with the aid of coincident surface observations, the differences are further related to ice type, specifically the presence of grease ice or thin ice, and surface conditions. (Auth. mod.)

F-49428

Markus, T., Burns, B.A., **Detection of coastal polynyas with passive microwave data**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.351-355, 4 refs.

A method to detect sub-pixel-scale polynyas with passive microwave data has been developed. Models for the brightness temperature transition from sea ice to shelf ice, with and without a coastal polynya, are generated by simulating the satellite overflight across the coast. The models are compared with image data along transects across the coast; correlation coefficients are used to determine the best-fit model and thereby detect the influence of open water. Polynya areas derived from a single SSM/I overpass compare well with coincident AVHRR data, showing a mean difference of 156 km². A longer time series based on daily averaged SSM/I data over a study area adjacent to Halley Station indicates that openings and closings of polynyas are strongly correlated with station wind data. (Auth. mod.)

F-49429

Lucchitta, B.K., Mullins, K.F., Allison, A.L., Ferrigno, J.G., **Antarctic glacier-tongue velocities from Landsat images: first results**, *Annals of glaciology*, 1993 Vol.17, International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992. Proceedings, p.356-366, 17 refs.

In this paper, the velocities of 6 glacier tongues and a few tongues within ice shelves distributed around the antarctic coastline are measured by determining the displacement of crevasse patterns seen on sequential Landsat images. The velocities range from less than 0.2 km/yr for East Antarctic ice-shelf tongues to more than 2.5 km/yr for the Thwaites Glacier Tongue. All glacier tongues show increases in velocity toward their distal margins. In general, the tongues of glaciers draining the West Antarctic ice sheet have moved significantly faster than those in East Antarctica. This observation may be significant in light of the hypothesized possible disintegration of the West Antarctic ice sheet. (Auth. mod.)

F-49445

Delmas, R.J., **Natural artefact in Greenland ice-core CO₂ measurements**, *Tellus*, Sep. 1993 45B(4), p.391-396, 25 refs.

Paleoatmospheric concentrations of CO₂ over the last ice ages have been revealed by ice-core analysis. According to the time period (ice age or interglacial) and the hemisphere considered, the ice containing the analyzed air bubbles can be either alkaline or acid. It is shown that the interaction between acid and alkaline impurities, when they co-exist naturally in ice, could lead to the production of excess CO₂ in ice samples, and therefore to erroneously high CO₂ values of no paleoatmospheric significance. The phenomenon is thought to occur only in Greenland ice during climatic transitions, and does not affect the low CO₂ levels found in Greenland and antarctic ice cores for glacial ages. (Auth. mod.)

F-49475

Oerlemans, J., **Possible changes in the mass balance of the Greenland and antarctic ice sheets and their effects on sea level**, *Climate and sea level change: observations, projections and implications*. Edited by R.A. Warrick et al, Cambridge, Cambridge University Press, 1993, p.144-161, 45 refs.

DLC QC981.8.C5 W37

In this contribution the basic physical principles governing the growth and decay of ice sheets are summarized. This involves both a schematic description of the plastic flow of ice, as well as the nature of the surface mass balance. Large differences between the Greenland and antarctic ice sheets are evident. Antarctica experiences a much colder climate, implying that the mass balance is between accumulation and iceberg calving; ablation is negligible. In contrast, on the Greenland ice sheet the loss is roughly equally partitioned between ablation (and subsequent runoff) and iceberg calving. The implication of this difference with respect to greenhouse warming is discussed. In broad view, one expects antarctic accumulation to increase with temperature, while a decrease in mass balance is most likely for the Greenland ice sheet. However, the uncertainties in existing estimates of sensitivity are very large. The possibility of ice flow instabilities that can be triggered in the event of a large warming, in particular in West Antarctica, add further to this uncertainty. (Auth. mod.)

F-49476

Paren, J.G., Doake, C.S.M., Peel, D.A., **Antarctic Peninsula contribution to future sea level rise**, *Climate and sea level change: observations, projections and implications*. Edited by R.A. Warrick et al, Cambridge, Cambridge University Press, 1993, p.162-168, 12 refs.

DLC QC981.8.C5 W37

This paper discusses the contribution of the Antarctic Peninsula, the warmest sector of Antarctica, to current sea level rise. In the last 40 years the Antarctic Peninsula has witnessed a 2 C rise in temperature, and precipitation (obtained from ice cores) has increased also. At sea level, where surface snow and ice melts each summer, there has been a dramatic disintegration of the Wordie Ice Shelf and an expansion of summer snow-free ground at coastal antarctic stations. At a few sites repeated surveys of the height of the ice sheet surface between benchmarks on nunataks show only minor changes of elevation, implying that there the ice sheet is stable. The absence of a strong link between Antarctic Peninsula temperature and mass balance makes uncertain a future prediction of the impact of the region on sea level. The best estimate is that over the next 100 years an additional contribution to sea level rise should not lie outside -3 cm to +1.5 cm. (Auth. mod.)

F-49477

Schlesinger, M.E., **Model projections of CO₂-induced equilibrium climate change**, *Climate and sea level change: observations, projections and implications*. Edited by R.A. Warrick et al, Cambridge, Cambridge University Press, 1993, p.169-191, 29 refs.

DLC QC981.8.C5 W37

The changes in the equilibrium climate induced by a doubling of the CO₂ concentration have been simulated by energy-balance, radiative-convective and general circulation climate models. The warming simulated by the general circulation models (GCMs) increases from the tropics toward the winter pole, but the regional changes show significant differences among the models. The changes in soil water simulated by the GCMs show a moistening of the soil over much of Eurasia and North America in winter and decreased soil water in summer. However, the geographical extent of the summertime desiccation varies among the models. The CO₂-induced changes in the annual snow accumulation rate simulated by one GCM show increases above and decreases below 1,500 m and 2,000 m over An-

tarctica and Greenland, respectively. The $2 \times \text{CO}_2$ - $1 \times \text{CO}_2$ change in the annual area-integrated snow accumulation rates would raise sea level by 8.6 cm per century. The net change in sea level between now and 2030, due to this effect alone, would be less than 1 cm. Other models, however, suggest that total precipitation over both Greenland and Antarctica would increase, leading to a negative contribution to sea level rise. (Auth. mod.)

F-49492

Crowley, T.J., Parkinson, C.L., **Late Pleistocene variations in antarctic sea ice. 1. Effect of orbital insolation changes**, *Climate dynamics*, 1988 3(2), p.85-91, 27 refs.

The effect of orbitally induced insolation changes on antarctic sea-ice cover are examined by means of a dynamic-thermodynamic sea-ice model. Results are compared with modified CLIMAP 18000 B.P. sea-ice reconstructions. Calculations suggest that changes in insolation receipt had only a minor influence on Pleistocene sea-ice distributions. The small response can be explained by a number of factors: albedo effects reduce the insolation perturbation at the surface; some of the shortwave radiation entering the ocean contributes to bottom ablation rather than lateral melting; the radiation perturbation at the upper surface of the ice must go to warming the surface to the melting point before melting ensues; and finally, the relatively high heat capacity of open water damps the surface temperature response to altered seasonal insolation perturbations. (Auth.)

F-49493

Crowley, T.J., Parkinson, C.L., **Late Pleistocene variations in antarctic sea ice. 2. Effect of interhemispheric deep-ocean heat exchange**, *Climate dynamics*, 1988 3(2), p.93-103, Refs. p.101-103.

Variations in production rates of warm North Atlantic Deep Water (NADW) have been proposed as a mechanism for linking climate fluctuations in the northern and southern hemispheres during the Pleistocene. The authors tested this hypothesis by examining the sensitivity of a thermodynamic/dynamic model for antarctic sea ice to changes in vertical ocean heat flux, and comparing the simulations with modified CLIMAP sea-ice maps for 18,000 B.P. Results suggest that changes in NADW production rates, and the consequent changes in the vertical ocean heat flux in the Antarctic, can only account for about 20-30% of the overall variance in antarctic sea-ice extent. This conclusion has been validated against an independent geological data set involving a time series of sea-surface temperatures from the subantarctic. The latter comparison suggests that, although the overall influence of NADW is relatively minor, the linkage may be much more significant at the 41,000 year obliquity period. Atmospheric CO_2 changes may be more important for linking the two hemispheres. (Auth. mod.)

F-49495

Carleton, A.M., **Antarctic sea-ice relationships with indices of the atmospheric circulation of the Southern Hemisphere**, *Climate dynamics*, 1989 3(4), p.207-220, Refs. p.218-220.

A link between the antarctic sea-ice extent and low-frequency atmospheric variations, particularly ENSO, has been suggested by recent modeling and empirical studies. This question is examined here using a high-resolution (by week, by region) database of antarctic sea-ice extent for the 1973-1982 period. The sea-ice variations are examined in the context of longer-term indices of the large-scale atmospheric circulation. These are a Southern Oscillation Index (SOI) and an index of sea-level pressure (SLP) wavenumber one in the Southern Hemisphere extratropics. The indices are updated through 1982. Correlation analysis of the monthly sea ice and circulation index values reveals that much of the apparent link between the ice and the SOI suggested in previous studies arises from autocorrelations present in both data sets and the strong annual cycle of sea-ice extent. In order to reconcile these findings with previous studies that show

some strong ice-circulation interactions on regional scales, only those months in which significant correlations occur between both large-scale circulation indices and the sea ice are examined further. These occur preferentially in the Ross and Weddell sectors, which are the regions contributing most to the variability of antarctic sea ice. (Auth. mod.)

F-49496

Oerlemans, J., **Ice shelves and icebergs—an overview**, *Circumpolar journal*, 1989 4(2-3), p.13-22, 7 refs.

Since melting on the antarctic ice sheet is very limited, all ice/snow accumulated at the surface ultimately leaves the continent in the form of icebergs. The huge tabular icebergs break away from the edge of ice shelves, floating tongues of ice several hundreds of meters thick. In this article a short overview is given of the characteristics of ice shelves. The processes responsible for the formation of the large icebergs are discussed. It appears that prediction of large calving events will remain impossible, even with sophisticated models. This is due to the large variation in the physical properties of ice, which cannot be mapped in sufficient detail. (Auth.)

See also:

A-48802 B-47423 B-47442 B-47478 B-47479 B-47526 B-47612 B-47716 B-47879 B-48027 B-48231 B-48232 B-48233 B-48234 B-48235 B-48236 B-48237 B-48364 B-48391 B-48422 B-48631 B-48663 B-48744 B-48747 B-48755 B-48799 B-48814 B-48911 B-48960 B-49111 B-49113 B-49116 B-49187 B-49228 B-49303 C-48459 C-48649 C-48787 C-48788 C-48913 C-48944 C-48948 C-49069 D-48228 D-48852 E-47666 E-47714 E-47715 E-47817 E-47992 E-47994 E-48078 E-48122 E-48126 E-48127 E-48285 E-48597 E-48638 E-48639 E-48765 E-48839 E-48860 E-48872 E-48974 E-48977 E-48978 E-49027 E-49028 E-49031 E-49053 E-49272 G-47698 G-47783 G-47835 G-48558 G-48596 G-48620 G-48937 G-48942 G-48943 G-49216 G-49336 G-49474 I-47399 I-47425 I-47655 I-47722 I-47885 I-47931 I-47940 I-47943 I-47944 I-47954 I-47956 I-47957 I-48083 I-48090 I-48148 I-48284 I-48303 I-48309 I-48345 I-48352 I-48388 I-48460 I-48539 I-48540 I-48543 I-48546 I-48547 I-48559 I-48560 I-48622 I-48657 I-48670 I-48738 I-48739 I-49043 I-49047 I-49050 I-49055 I-49056 I-49087 I-49123 I-49124 I-49207 I-49252 I-49254 I-49258 I-49359 I-49361 I-49446 I-49448 J-47953 J-48101 J-48186 J-48229 J-48230 J-48408 J-48727 J-48845 J-48846 J-49065 J-49070 J-49180 J-49292 J-49300 L-48542 L-48556 M-48589 M-49275

G. LOGISTICS, EQUIPMENT & SUPPLIES

G-47447

U.S. Naval Support Force Antarctica, **Report of Operation Deep Freeze 85, 1984-1985**, 1985, Var. p.

The support to the National Science Foundation in conjunction with the U.S. Antarctic Research Program, provided by the U.S. Naval Support Force Antarctica from Aug. 1984 to Mar. 1985 as Operation Deep Freeze 85, is described. Included in the logistic support of scientific research were the fundamental life support requirements of food, shelter, water, heat and medical services to McMurdo residents and the logistic resupply of McMurdo, Amundsen-Scott, Byrd and Palmer Stations plus support of Scott Base, the nearby New Zealand camp. An aerial mapping project was again undertaken with the U.S. Geological Survey. A chronological summary of significant events and a list of participating organizations are also provided.

G-47694

Incoll, P., **Panelised forms of building construction for antarctic regions**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.564-570, 4 refs.

Panelized buildings are defined as buildings in which the floor, walls, and roof are prefabricated in large panels for rapid assembly on site. The differences between panelized buildings and other forms of prefabrication are discussed and the advantages of the panelized design for antarctic buildings are identified. The development of the concept to date is described and further directions of its development are identified. (Auth.)

G-47696

Archibald, J., **Prefabricated engineering services for use in antarctic regions: pipe lines in harsh environments**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.577-586, 4 refs.

Prefabricated engineering services are defined as engineering items such as pipework, valve assemblies and power distribution which are mostly fabricated in the manufacturing phase and thus require minimum effort and time for construction in the harsh antarctic environment. This concept is discussed along with the alternative design configuration considered during the design development stages, through initial manufacture, field trials, practical application and modification. (Auth.)

G-47698

Barthelemy, J.L., **Near breakup of the surface-flooded ice wharf at McMurdo Station, Antarctica**, International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992. Proceedings. Vol.2. Edited by M.S. Triantafyllou, J.S. Chung, K. Karal, and A.L. Tunik, Golden, CO, International Society of Offshore and Polar Engineers (ISOPE), 1992, p.592-599, 5 refs.

During the International Geophysical Year, and for several years thereafter, supply ships escorted by icebreakers moored to the sea ice

off McMurdo Station and discharged cargo onto sleds. In the mid-sixties, Winter Quarters Bay was cleared of ice and ships began to dock directly along the shoreline at McMurdo. Elliott Quay, a major dock structure built to arrest the resulting progressive erosion, was destroyed by a freak storm in Mar. 1972. Since then, a succession of man-made ice wharves have been built to handle ship traffic. In Jan. 1991, the newest ice wharf broke into several fragments as a vessel was moored alongside. The National Science Foundation selected a task force to investigate the incident. This paper describes the events preceding the mishap and presents the findings of the task force. (Auth.)

G-47783

Blaisdell, G.L., Klovov, V.D., Diemand, D., **Development of a wheeled runway for McMurdo on the Ross Ice Shelf**, MP 3211, Cambridge, England, Scientific Committee on Antarctic Research, 1992, 31p., 14 refs. Presented to the Standing Committee on Antarctic Logistics and Operations (SCALOP), at the 22nd meeting of SCAR, San Carlos de Bariloche, Argentina, June 15-19, 1992.

The U.S. Antarctic Program currently operates aircraft from an annual sea ice runway at McMurdo until about Dec. 15th of each year. After that time it is limited to use of a snow runway and ski-wheel aircraft. Large cargo aircraft of this type are very specialized and in short supply. On the Ross Ice Shelf near McMurdo, an experimental runway to support heavy wheeled aircraft has been constructed. This runway capitalizes on the natural characteristics of the location and uses only snow and ice for construction materials. Such a runway is appealing because of its ability to support heavy wheeled cargo aircraft while requiring a relatively small construction and maintenance effort, and causes only minimal impact to the site. The runway is located inside the transition zone between the accumulation and ablation regions on the ice shelf. It uses a thin permanent cap of snow over natural blue ice to a) level undulations in the underlying surface, and b) protect the ice from intense solar radiation during the peak of summer (to prevent subsurface melt-pool formation). The snow cap was produced by compaction with a heavy roller during the warmest part of the year and the snow was then left to sinter and strengthen with falling temperatures. In early Feb. the snow cover was strong enough to support wheeled operation of a fully loaded LC-130.

G-47835

Delisle, G., Sievers, J., **Site survey for future heat flow measurements, Prince Albert Mountains, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.138-139.

The aim of this survey was the identification of ice fields with an internal temperature field characterized by predominantly conductive heat transfer. Blue ice fields of limited thickness and minor surface topography are most favorable in this respect. Suitable drill sites on blue ice fields at which terrestrial heat flow is to be measured will be selected after evaluation of the available data.

G-47887

Muller, P., **Antarctic snow cruiser, American heritage of invention and technology**, Winter 1993 8(3), p.63-64.

This latest update on the fate of Tom Poulter's snow cruiser sketches the rush of the construction and display phase of the vehicle, the onloading on Nov. 15, 1939, and the near disastrous off-loading on the Ross Ice Shelf in early January 1940. Though it made a good

bivouac, being warm and comfortable at a stationary location, it had severe flaws: it was so heavy it sank into the snow; the wheels provided no traction; and it was seriously underpowered. As WWII approached, the cruiser was abandoned and its fate became unknown. Some have said the ice it rested on broke from the shelf, floated out to sea, and sank. No sightings were reported. Others say the Soviets rescued it and took it home with them; this remains unverified. For earlier accounts see CRREL 1534 (1939); 2642 (1940); 4287 (1940, French); 4814 (1945); and 40-4012 (Antarctic Bibliography 15G-33977, 1986)

G-47927

Muñoz M., G., **Architecture in Antarctica** [Arquitectura en Antártica], *Boletín antártico chileno*, Oct. 1992 11(2), p.7-9, In Spanish.

In view of the need for adequate housing and working facilities in the hostile antarctic environment, two propositions containing concepts for the development of social interaction and scientific and tourist activities are presented. In addition, an architectural project to be carried out in the summer of 1993 in the vicinity of the Rodolfo Marsh Station, and intended to meet the above-mentioned needs, is described. Building models are illustrated.

G-48036

Tleimat, B., **Use of vapor compression distillation for recycling gray water as an early application in the antarctic planetary analog**, *Desalination*, Sep. 1992 87(1-3), p.97-107, 6 refs.

Gray water is a major fraction of the waste water from small isolated outposts such as antarctic bases and planned Lunar and Martian bases. Recycling of this water is a key element in a reliable and efficient life support system. This paper describes the design and test of a gray water recycling system based on vapor compression distillation. The Exploration Program group at LMSC funded Water Reuse Technology to test and obtain data on the use of vapor compression distillation for the recovery of distilled water from gray waters. Results show that the system produced excellent quality distilled water with recoveries approaching 99%. (Auth. mod.)

G-48168

Jun, H.K., **Installation of the ground-based telecommunications system with polar orbiting satellites at King Sejong antarctic station**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.95-102, In Korean with English summary. 4 refs.

A ground-based system to communicate with the first Korean Telecommunication satellite (KITSAT-1) was installed at King Sejong Station by Korea Ocean Research & Development Institute (KORDI) and SaTellite Research Center (STRC) of the Korea Advanced Institute of Science & Technology (KAIST). The system consists of highly efficient machines, including software (tracking, packet, telemetry, CCD image) and hardware (PC 386, modem, TNC, LNA, HPA, transceiver, polarizer, antenna, tower, etc.). In the near future, scientific data and information will be transmitted by this system. (Auth.)

G-48169

Oh, J.H., **Logistic activities for the operation and maintenance of King Sejong Station**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.103-109, In Korean with English summary.

Korea's antarctic research activities began with the completion of King Sejong Station, on King George I. on Feb. 17, 1988. This report includes a description of various activities at the station, such as enlarging the station's buildings, ship-to-shore cargo operations by helicopter, and the packing and transport of waste from the station.

G-48282

Engler, M., **Construction of the Dumont d'Urville airfield** [Construction de l'aerodrome de Dumont d'Urville], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.78-83, In French with English summary.

Detailed plans for the construction of a coastal airstrip in the vicinity of Dumont d'Urville Station are reviewed. An experimental model for a causeway 100 m long and 60 m wide, created after a preliminary study of environmental conditions at the selected site, is described. The construction of the actual causeway across 7 islets, 1000 m long and able to support a runway, began in the summer of 1988-1989 and is to be completed in Dec. 1992.

G-48283

Guichard, A., Regrettier, J.F., **Polar engineering** [Ingenierie polaire], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.84-87, In French with English summary.

The polar area's specific and particularly hard climate requires the development of new techniques. France, whose station on Adélie Coast is an exceptional experimental site, has launched a wide-ranging technological research program, involving continuous field work since 1987. This polar engineering research centers on four main themes: structure analysis, ground-structure interaction, ice-structure interaction, and environmental data processing.

G-48297

Leguet, J.L., **Use of concrete for new structures on Adélie Coast** [Emploi du béton pour la construction de nouvelles infrastructures en Terre-Adélie], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.76-80, In French with English summary.

A laboratory test and the building of a hangar, designed to prove the feasibility of the use of concrete in polar construction, are described. After providing some guidelines for dealing with low temperature and wind action effects on materials and equipment, it is concluded that the results of the operation permit one to consider with confidence the use of concrete on Adélie Coast.

G-48306

DenHartog, S.L., **Field survey of potential airstrip locations: Mt. Howe, Antarctica, 1991**, *U.S. Army Cold Regions Research and Engineering Laboratory. Special report*, SR 93-01, Feb. 1993 6p., ADA-263 199, 1 ref.

The blue ice area just west of the Mt. Howe ridge was surveyed with the intent of establishing a runway for large, wheeled cargo aircraft. Site limitations and wind observations precluded selection of an airstrip location. Installation of an automatic weather station to monitor winds at the site will allow determination of site suitability. (Auth.)

G-48311

Takeuchi, S., **Newly developed snow vehicle (SM100S) for Antarctica. 1. Necessity and process of the development**, *Antarctic record*, Nov. 1992 36(3), p.363-375, In Japanese with English summary. 3 refs.

Specifications and illustrations of 4 types of snow vehicles and tractors, operated by JARE on inland ice sheets, sea ice and inland traverses, are presented. As the JARE research area is expanding to increasingly colder regions, a new snow vehicle capable of operating in very low temperatures and low pressure conditions was designed and tested in the winter of 1992. Its performance on the antarctic ice sheet is reported to be satisfactory.

G-48312

Nakajima, M., Hosoya, M., **Newly developed snow vehicle (SM100S) for Antarctica. 2. Design of the system**, *Antarctic record*, Nov. 1992 36(3), p.376-392, In Japanese with English summary. 2 refs.

The design of the systems of a newly developed snow vehicle, which will be used in a deep ice coring project at Dome Fuji, is described. The vehicle is a cab-over full-track type with accommodations for two. It is 11,500 kg in gross weight, and it traverses the ice sheet at 5-8 km/h, pulling 7 wooden sledges weighing 2.6 t in loaded weight each. The vehicle operates from the plain up to the high plateau (4,000 m) at temperatures down to -60 C; it can survive temperatures as low as -90 C. Specifications and illustrations of the SM100S and some of its parts are included.

G-48313

Sakui, S., Nakajima, M., **Newly developed snow vehicle (SM100S) for Antarctica. 3. Low temperature toughness of the welded joints of the structural steel**, *Antarctic record*, Nov. 1992 36(3), p.393-397, In Japanese with English summary. 2 refs.

For the purpose of developing a new snow vehicle for a deep ice coring project at Dome Fuji, the low temperature resistance of structural steel welded joints was investigated. It is proposed that in cases of vehicles employed in temperatures of -50 C, the brittle fracture of the structural members will not occur, provided that semi-chilled or chilled steel is used, for which 50% FATT (fracture appearance transition temperature) of the Charpy impact test is about -50 C, and the Charpy impact values at -50 C are 20-29 J/sq cm. Based on results of the Charpy impact test performed, it is concluded that the JIS steels SL2N255 and STPL450 can be used in the construction of the new snow vehicle at Dome Fuji.

G-48314

Maekawa, E., Terayama, Y., **Newly developed snow vehicle (SM100S) for Antarctica. 4. Low temperature properties of crawler belt**, *Antarctic record*, Nov. 1992 36(3), p.398-409, In Japanese with English summary. 6 refs.

In order to discover a high cold-resistance material for use in the crawler belt of snow vehicles, the physical properties at very low temperatures of a recently developed material, isoprene/butadiene (70/30) random copolymer filled with carbon black, were investigated and compared with those of a blended rubber NR/BR (65/35) and a currently used NR. Test results show that the isoprene material can keep its rubber elasticity even at temperatures below -70 C. Although it was found to be somewhat inferior to the other two materials in stress-at-break and tear tests, its use is recommended in the construction of snow vehicles in Antarctica.

G-48315

Saito, M., Seki, T., Hosoya, M., **Newly developed snow vehicle (SM100S) for Antarctica. 5. Result of general performance tests**, *Antarctic record*, Nov. 1992 36(3), p.410-440, In Japanese with English summary.

The results of fundamental and general performance tests of a newly developed snow vehicle, to be used in a deep ice coring project at Dome Fuji, showed the following: the vehicle's performance and the purpose of the system's design were found to be satisfactory, but its structure was not. The tests were carried out on concrete pavement, where the vehicle's performance can be compared to that of similar vehicles, and on a compacted-snow surface which has the simulated hardness of antarctic snow.

G-48558

Kim, D.H., Kwok, K.C.S., Smedley, D.J., Rohde, H.F., **Modelling of snowdrift around prismatic buildings for antarctic environment**, *International journal of offshore and polar engineering*, Mar. 1992 2(1), p.73-79, 32 refs. For other versions see 46-231 or 19F-44686.

Modelling of snowdrift was conducted in a purpose-built turbulent boundary layer wind tunnel. A number of similarity criteria, in particular time scaling, for the physical modelling of snowdrift in a wind tunnel were examined. Iversen's (1980) proposed dimensionless time, which includes scaling of particle and fluid densities, Froude number, particle threshold speed, mean wind speed, time and length, was found to produce a reasonable correlation of snowdrift accumulation rate between model and prototype. Tests were also carried out to investigate the relationships between different dimensions of prismatic building and snowdrift. The results were used to formulate design guidelines for buildings in Antarctica. (Auth.)

G-48575

Rinaldi, C.A., **Technical means used in Antarctica** [Medios técnicos utilizados en la Antártida], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.113-118, In Spanish.

Vehicles used for access by sea and air to Argentine antarctic stations, and oversnow transportation, are described. The systems used for generating drinking water, heat and waste treatment at the stations are discussed.

G-48596

Kwok, K.C.S., Smedley, D.J., Kim, D.H., **Snowdrift around antarctic buildings—effects of corner geometry and wind incidence**, *International journal of offshore and polar engineering*, Mar. 1993 3(1), p.61-65, 12 refs. For other versions see 47-1845 or G-47697.

Modelling of antarctic snowdrifting was conducted in a turbulent boundary layer wind tunnel. A series of 7 models was designed, based on the extended dimensions of a shipping container. Tests were carried out to investigate the effects of varying the model corner geometry and the angle of wind incidence on snowdrift formation. The results were used to formulate design guidelines for buildings in Antarctica.

G-48620

Hannuki, T., **Construction of the new central building of Syowa Station, Antarctica. 1. Preliminary design of the building**, *Antarctic record*, Mar. 1993 37(1), p.61-102, In Japanese. 8 refs.

The history of building construction at Showa Station by the Japanese Antarctic Research Expedition is surveyed and the present conditions of these buildings are discussed. It is found that the living quarters consisting of the oldest buildings should be replaced as soon as possible. Designs dealing with transportation, climate and construction in polar regions are presented. The development and improvement of the building prefabrication system at Showa Station are reviewed. Fire-preventive plans, and a new wooden structural system with large-scale laminated timber are shown in the design. The future of polar buildings is discussed. (Auth. mod.)

G-48678

Howington, J.P., McFeters, G.A., Barry, J.P., Smith, J.J., **Distribution of the McMurdo Station sewage plume**, *Marine pollution bulletin*, 1992 25(9-12), p.324-327, 15 refs. For another version see J-48450.

The spatial distribution and movement of the sewage plume from McMurdo Station was investigated in the ocean under the early summer ice. Samples of seawater were obtained via holes drilled through the ice and analyzed for coliform bacteria. Ocean currents were also examined to determine their effect on the movement of the plume. High densities of coliform bacteria were found along the ca. 1 km shoreline of McMurdo Station and the plume extended 200-300 m seaward. The relocation of the outfall from a surface configuration to the subsurface (11 m deep) had little influence on the distribution of the plume that sometimes reached the seawater intake station, 400 m to the south. Ocean current measurements in the study area confirmed that, while the prevailing advection was to the north and away from the intake area, episodic reversals of flow at some current meter stations coincided with pulses of sewage that moved into the intake. These findings support the use of bacterial indicators as one means to map the distribution and movement of recent sewage contamination in cold (-1.8 C) seawater, and provides evidence that the disposal and movement of domestic wastes in coastal polar environments deserves attention.

G-48679

Venkatesan, M.I., Mirsadeghi, F.H., **Coprostanol as sewage tracer in McMurdo Sound, Antarctica, *Marine pollution bulletin***, 1992 25(9-12), p.328-333, 33 refs.

Sediment cores from the vicinity of sewage outfalls off McMurdo Station as well as surface grab samples from different locations in the McMurdo Sound were analyzed to assess the degree of sewage addition to the Sound. Sediment samples close to the point source contain as much as 3 mg/g dry sediment of coprostanol, whereas samples farther from the source, for example from New Harbour and Granite Harbour, contain only trace levels to 40 ng/g. Coprostanol in the sediments of latter locations most likely originates from seals rather than from sewage outfalls. It appears that sewage particles are very quickly incorporated into the sediment layers close to the discharge point in the eastern Sound. However, significant levels (930 ng/g) of fecal sterols were detected in Cape Armitage surface sediments, indicating that the sewage plume could also have reached the seawater intake station, situated in between the outfall and Cape Armitage sampling site. These results suggest the need for a sound environmental monitoring and assessment of the existing wastewater practices in the region. (Auth. mod.)

G-48896

Leith, W., **Twelve years as master of the SA Agulhas, *South African journal of antarctic research***, 1991 21(2), p.147-153.

The SA Agulhas replaced South Africa's antarctic research and supply vessel, the RSA, and departed from Cape Town on her maiden voyage to Marion I. on Apr. 7, 1978. The master of the ship provides some technical information, such as the ship's vital statistics and mechanical details, passenger and crew accommodation and research facilities, cargo handling, operational characteristics, etc. In his personal impressions he includes the description of the work on the subantarctic islands and at SANAE Station, the research equipment used, and plans for a major refitting and upgrading of the ship during 1992.

G-48921

Melander, O., ed, Fontana, L.R., ed, **Proceedings of the Fifth Symposium on Antarctic Logistics and Operations, San Carlos de Bariloche, Argentina, 8 to 10 June 1992**, Buenos Aires, Dirección Nacional del Antártico, 1993, 365p., Refs. passim. For individual papers see A-48923, A-48945 through A-48947, B-48922, B-48924, B-48925, B-48932, B-48935, C-48944, G-48929 through G-48931, G-48933, G-48934, G-48936 through G-48941, G-48943, H-48926 through H-48928, J-48942 or 47-5112 through 47-5118.

This is a collection of papers presented at the Fifth Symposium on Antarctic Logistics and Operations, held June 8-10, 1992, in San Carlos de Bariloche, Argentina. The Symposium was conducted by the Standing Committee on Antarctic Logistics and Operations (SCALOP) of the Council of Managers of National Antarctic Programs (COMNAP). Among the 26 papers presented, there are some dealing with general issues related to antarctic logistics regarding ships, stations and transportation, but the emphasis of the Fifth Symposium was on environmental impact issues, with one day dealing with oil-spill fighting, a field in which a subgroup of SCALOP is reported to be working.

G-48929

Sayers, J., **Oil spill prevention and response**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.122-135.

In 1990 the Council of Managers of National Antarctic Programs (COMNAP) requested its Standing Committee on Antarctic Logistics and Operations (SCALOP) to develop policies and procedures on oil spill prevention and response in the Antarctic. A Sub-group on Oil Spill Prevention and Response was established to undertake the task. This paper outlines the principal recommendations developed by the Sub-group during the last two years. The measures recommended include procedures on oil storage, oil transfer and contingency planning, as well as proposals on other relevant matters, including the minimum experience required of ship navigation officers, hydrography, and the use of non-persistent fuels. (Auth.)

G-48930

Buccolini, R., Cucinotta, A., Caligiuri, G., **Project construction and operations of the tanks for the fuel storage in Terra Nova Bay—Description of the first refuelling operation**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.136-149.

The operation carried out on Jan. 18, 1992 during the 7th Italian Antarctic Expedition, consisting of supplying the Terra Nova Bay Station with 920,000 l of JP-8 (avio kerosene), is described. The fuel was transferred from a tanker to two storage tanks placed at 44 m above sea level; the transfer, cleaning and safety systems are discussed. An analysis of risks and evaluation of environmental impact in case of an oil spill are presented; rescue plans for personnel and animals are outlined.

G-48931

Castellvi, J., Meana, E., **Supply and storage of fuel in the Spanish antarctic base Juan Carlos I**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.150-153.

The procedure of ship-to-shore transfer and storage of fuel at Juan Carlos I Station is described and illustrated. Details regarding the supply line, the pumping system, the storage tanks and the fuel flow operation are given.

G-48933

Kohlmeyer, C.R.C., **Petroleum pollution prevention, response and remediation in the Antarctic: an equipment and procedural approach**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.157-172, 7 refs.

This overview presents several key issues for the prevention and remediation of petroleum pollution in the antarctic environment. The use of state of the art equipment, properly maintained, combined with site specific operational procedures, are components of a zero release philosophy. The equipment and procedures must be tailored to the harsh antarctic environment and the specialized petroleum products that are currently in use there. The development of a set of detailed standards and recommended practices allows for a uniform program designed to minimize petroleum releases. The training and implementation of new procedures must be carefully tailored to the unique psychological environment of the antarctic community. Upgrading existing tanks with secondary containment systems, leak detection sensors, and dry-break delivery nozzle technology is presented as a cost effective strategy. If this were coupled with adequate training and formal operational procedure, the zero release goal would be attainable. (Auth. mod.)

G-48934

Kohnen, H., Henning, K., **Mobile oil spill fighting unit**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.173-176.

A mobile oil spill fighting unit has been developed which consists of light-weight components. The components can easily be assembled and handled for the effective recovery of oil spills of the order of some tons of oil. The efficiency of the unit is significantly enhanced by using a nontoxic polymer sprayed on the spill, acting as a cohesive agent and making the oil viscoelastic. It might be of advantage to use air propulsion for the oil skimmers when positive temperatures are expected. The oil-polymer mixture can be re-used. (Auth.)

G-48936

Sayers, J., **Oil spill response in Antarctica**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.199-206, 6 refs.

Large quantities of fuel oil are transported and consumed in the Antarctic Treaty area to provide logistical support for the scientific and operational programs of national antarctic operators. There is also increasing tourist traffic to Antarctica using ships and, to a lesser extent, aircraft. Oil spill response action in Antarctica is inhibited by the remoteness, climate, weather and ice conditions and by the limited manpower resources available at antarctic stations. Effective response to oil spills requires prompt action to contain and recover the

oil. This paper recommends that all vessels operating in the Antarctic Treaty area carry on board oil spill response equipment. It is further recommended that similar equipment be carried at antarctic stations and that the equipment on ships and at stations be compatible to facilitate combined response action. A suggested inventory of response equipment for ships and stations is given. (Auth.)

G-48937

Bresnahan, D.M., **Use of the C-5 Galaxy in support of the United States Antarctic Program**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.238-245.

The National Science Foundation (NSF) has overall funding and management responsibility for U.S. activities in Antarctica. The United States Antarctic Program (USAP) relies heavily on airlift support, both intracontinental and intercontinental, to provide logistics support to all elements of the program. The annual ice runway allows conventional wheeled aircraft to fly between McMurdo and Christchurch, New Zealand, from early Oct. through early Dec. each austral summer. The ability to move large amounts of cargo to McMurdo by air earlier in the season gives the USAP the capability to support projects which would normally be dependent on surface vessels for the delivery of needed support material early in the austral summer. Operations of the C-5 aircraft at McMurdo are described.

G-48938

Sadler, P., **Establishment of greenhouses at the United States McMurdo and South Pole stations**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.246-252.

Fresh vegetables are being produced in growth chambers for the isolated personnel at two United States antarctic stations, McMurdo and Amundsen-Scott. Use of artificial illumination and hydroponic culture produces elevated yields over normal field culture. This allows a relatively small area to supply a large population with fresh produce. During the austral summer, station-grown produce is cost effective when transportation costs are included, and it frees up limited aircraft resources. During winter it becomes a sole source for fresh produce that cannot be frozen or survive mid-winter air drop. Construction and operation of growth chambers were done on a volunteer basis, and they enjoy considerable popularity as a recreational activity. The chamber also provides a space that is brightly lit and a source of full-spectrum lighting to combat Seasonal Adjustive Disorder. The growth chamber at Amundsen-Scott will allow studying the response to the presence of plants by station personnel in a plantless situation. (Auth.)

G-48939

Lori, A., Meneghello, S., Scarano, G., Voli, D., **Study of a new waste water treatment plant for the Italian antarctic station**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.253-257.

During the 1987-1988 season, a biological water treatment plant was installed at the Terra Nova Bay Station which was capable of treating up to 10 cu m of sewage per day, accommodating 40-45 people. When the station was enlarged to accommodate up to 65 people, the water treatment plant had to be replaced by a larger one. Since during its operation the treatment plant had displayed some weaknesses, such as an initial transient period of very low efficiency which could not be corrected, it was decided to test a totally different

process, a physical-chemical one. This article describes the details of the test performed; the plans for the new plant are included and discussed.

G-48940

Berg, Å., **Vehicles and transports during the Swedish Antarctic Research Programme 1991/92**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.258-266.

The transport system for the 1991-92 Swedish expedition, as well as earlier expeditions, was mainly based on the Hägglunds Bv 206 All-Terrain Carrier. The Bv 206 was chosen with respect to the current range of application and 5,000 units in 15-20 different versions being already in operational use in the Swedish Army since the early 80s. The vehicles were of original design, but had been equipped for use in Antarctica. Modification work was kept to a minimum. Dwelling containers, containers for scientific samples, scientific equipment, food and fuel were transported from the unloading site on the sea-ice outside the Riiser-Larsen Ice Shelf to the Swedish and Finnish stations in Vestfjella, Queen Maud Land. One 1700-km and two 800-km traverses were carried out by scientists between Nov. 30, 1991 and Feb. 20, 1992. (Auth.)

G-48941

Kohnen, H., Müller, N., **Transport concept at the antarctic stations and for field operations of the Alfred Wegener Institute**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.267-273.

The antarctic operations of the Alfred Wegener Institute for Polar and Marine Research are primarily concentrated on the Weddell Sea and the adjacent ice-covered areas. Appropriate logistical technologies had to be developed and introduced to cope with the regional environmental conditions. The on-shore transport logistics has to be suitable for travelling as well as for carrying heavy cargo on soft snow surfaces. The range of temperatures encountered through the year is from about 0 to -50 C. The density of the snow surface is low, thus requiring vehicles exerting a low specific ground pressure. A tractor is described which is able to tow heavy loads on over-snow traverses. It can be used as a mobile scientific laboratory or simply as a personnel carrier; it can also be modified to a construction and service machine equipped with cranes, front blades, front shovels, lifting forks or winches. Also described are heavy cargo sledges which can alternatively be used for transporting bulk cargo, standard 20' cargo containers, 20' tank containers or 20' living modules.

G-48942

Federici, V.M., Poy, R.L., Cattáneo, N., **Aspects to be considered in planning logistic operations in the Weddell and Bellingshausen seas**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.274-299, 11 refs.

To facilitate naval operations dealing with logistic support to stations in the Weddell Sea and Bellingshausen Sea areas, local meteorological and glaciological data obtained during the last 20 years are discussed. It is concluded that the most favorable conditions to carry out such operations in the vicinity of the Antarctic Peninsula prevail from Dec. through Mar., which could possibly be extended to include Nov. and Apr. for tasks in specific areas.

G-48943

Sutherland, A.L., Kennedy, H., Voelker, R., St. John, J., **Performance of the *Nathaniel B. Palmer* in ice**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.300-309, 5 refs.

On the first voyage of the *Nathaniel B. Palmer* into ice, it transited well into the southwestern Weddell Sea to a position of 67.7S, 51.7W. This brought the ship into some of the thickest and oldest ice in the Weddell. Generally, Weddell Sea ice has a maximum age of 1 1/2 years, although floes of 2 yr ice do occur and were likely encountered. Ship performance throughout this journey was excellent. This paper, written aboard ship at the conclusion of the maiden voyage, details the ship's performance during the cruise. Attached is a companion paper which describes the vessel's specifications, procurement, and scientific capabilities. (Auth. mod.)

G-49090

Bower, W.I., **Use of renewable energy in selected Antarctica applications. Foreign trip report, 1-24 December, 1992, U.S. Department of Energy. Report**, Jan. 12, 1993 DOE/FTR-93010183, 86p., DE93 010183, 11 items of pertinent literature, p.19.

Sandia National Laboratories was requested by NSF and Antarctic Support Associates (ASA) to provide personnel, expertise, data acquisition system (DAS) hardware, training of ASA personnel for collection of data, and a feasibility report for using renewable energy, such as photovoltaics, in selected Antarctica applications. The work was performed under Technical Event 503 (T503), as assigned by ASA. The DAS hardware was installed at Lake Bonney in Taylor Valley, one of the important dry valleys in the Antarctic, where nutrient cycles of the primal-like, permanently ice-covered lake are being studied. A second DAS was installed at the Cosmic Microwave Background Research (CMBR) facility at Amundsen-Scott Station, where scientists are measuring cosmic background radiation to determine the nature of radiation produced during the formation of the universe. Additionally, visits were made to Lake Fryxell to review their power requirements and discuss the feasibility of using photovoltaics to supplement existing diesel-generation of their electrical power. The repeater and transmitter site at Black I. was toured to observe the installed PV/Wind/Closed-Cycle-Vapor-Turbine (CCVT) hybrid system in operation. The system was installed by Northern Power Systems and has been a shining success, with the goals of reduced maintenance and reduced fuel usage fully realized. (Auth. mod.)

G-49216

Lunardini, V.J., Rand, J., **Design of an antarctic water well, U.S. Army Cold Regions Research and Engineering Laboratory. Special report**, MP 3316, 1993 SR 93-22, International Symposium on Thermal Engineering and Science for Cold Regions, 4th, Hanover, NH, Sep. 28-Oct. 1, 1993. Proceedings. Edited by V.J. Lunardini and S.L. Bowen, p.143-152, 22 refs.

Potable water for Amundsen-Scott Station is obtained by melting surface snow and storing the water. This method has the following drawbacks: fuel costs are very high, the surface can be contaminated, and gathering snow can be dangerous during the polar night. Melting snow or ice at depth and forming in *in situ* water reservoir can overcome these handicaps. A method to obtain a thermal design for the Amundsen-Scott Station is described. A design for meeting the water needs of the station for 10 years while keeping the reservoir depth to less than 500 ft is discussed. (Auth.)

G-49291

DenHartog, S.L., Blaisdell, G.L., **Delivery of fuel and construction materials to South Pole Station, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, SR 93-19, July 1993 21p., ADA-270 431, 17 refs.**

Plans are underway to rebuild South Pole Station, ideally with minimal impact on the current science and operational program. The new station will require the delivery of massive amounts of construction materials to this remote site. The existing means of delivery to the South Pole include the use of specialized LC-130 Hercules aircraft that can operate on wheels or skis, and some materials are also air-dropped from C-141 aircraft. Neither of these delivery systems is expected to be capable, within a reasonable time period, of supporting both current operations and the transport needs for construction of a new station. Several options for moving construction materials and fuel to South Pole Station are analyzed. All of the options assume that goods will be transported to the antarctic continent by ship. The options include a) construction of a snow runway at the South Pole capable of supporting wheeled aircraft, b) development of an inland blue-ice runway capable of supporting heavy wheeled aircraft, located as close as possible to the South Pole, with over-snow vehicle haulage from the runway to the Pole (two potential sites are considered), c) over-snow vehicle haulage from McMurdo across the Ross Ice Shelf, up the Skelton or another glacier, and over the polar plateau to the Pole, and d) vehicle haulage from some coastal station (located at about 67S latitude) with an easier access route onto the polar plateau. Pros and cons of these options are discussed and issues associated with each are identified. The feasibility and risk associated with each option are covered as well. Estimates of costs for many of the factors involved with each option allow financial comparison of each delivery scheme. (Auth. mod.)

G-49325

Steinke, D., **Caterpillar Mobil-Trac system's application to cold regions mobility problems, U.S. Army Cold Regions Research and Engineering Laboratory. Special report, July 1993 SR 93-17, International Conference on Winter Vehicle Mobility, 1st, Santa Barbara, CA, June 1991. Proceedings. Edited by G.L. Blaisdell, p.192-197. ADA-271 546.**

This paper gives a quick rundown on Caterpillar's Mobil-Trac system and the mobility advantages it offers cold regions users. Particular emphasis is given to the CAT challenger tractor, a vehicle purposely designed to take maximum advantage of the Mobil-Trac system. Also included is a brief summary of a U.S. Army Cold Regions Research and Engineering Laboratory report on the evaluation of the tractor for use in Antarctica and a description of the series of trials held in Adélie Land (Jan. 1991). (Auth. mod.)

G-49336

Ishizawa, K., Kokawa, T., Hannuki, T., **Construction of ice domes at Asuka Station in Antarctica, Antarctic record, July 1993 37(2), p.115-127, 10 refs.**

An attempt was made to construct an ice dome in order to study the construction technique and to examine the deformation by creep and sublimation of ice in the Antarctic. A 10 m diameter membrane was inflated by a ventilator. Stored water was sprayed on it, and sometimes milled snow was blown by a small snow miller. About 13 t of water was used in making an ice dome 7 cm thick and 3 m high. The deformation of the ceiling grew with time due to creep. Sinking of the center reached 55 mm after 99 days. The wall thickness rapidly decreased due to sublimation in summer time; consequently, snow was occasionally added with a rotary snowplow. The ice dome was effectively used as storhouse and workshop. An attempt was made to obtain water outside by using a snow melter with an oil burner, for

another ice dome. A snow dome without water was also attempted, but the snow did not harden. (Auth.)

G-49339

Umemura, T., Hannuki, T., **On a trial estimation of construction work for the ground runway at East Ongul Island in Antarctic, Antarctic record, July 1993 37(2), p.176-195, In Japanese with English summary. \$6 refs.**

Plans for a ground runway to be built on East Ongul I. for year round use of JARE small airplanes are discussed. Seven plans are classified into two groups: plans for a small runway for the use of small planes such as the JARE Cessna-185 and Pilatus PC-6, and others for a large runway. The amount of earth work for each proposed runway was estimated and the proposals were assessed for practicality. Multiple reviews of these large-scale civil engineering works will be needed. Data obtained will be used for the next stage of review. (Auth.)

G-49430

Francis, A., **Safety in the operation of cryogenic systems at the South Pole, Cryogenics, Aug. 1993 33(8), p.818-820.**

Successful supply of liquid helium and liquid nitrogen to the South Pole, in support of the United States Antarctic Research programs, demonstrates that a reasonable logistic plan can safely provide cryogens anywhere on earth. Investigation of a liquid nitrogen tank failure indicates no contributing cause from environmental or operational factors; this emphasizes need for care in selecting equipment. (Auth.)

G-49474

U.S. Naval Support Force Antarctica, **Final report of Operation Deep Freeze '91 (1990-91), 1991, var. p.**

This report describes the military support provided to the National Science Foundation in conjunction with the U.S. Antarctic Program from Aug. 1990 to Mar. 1991 as Operation DEEP FREEZE 90/91. This included providing the fundamental life support requirements of food and medical services to McMurdo Station residents and the logistic pipeline for resupply of McMurdo, South Pole and Byrd Station, plus support of Scott Base, the nearby New Zealand camp. Inherent with the support requirements is the objective of safe operations. Administrative and recreational support were provided for McMurdo residents, and numerous forms of communication were also provided. A chronological summary of significant events during the operating period is given. The various organizations, units and commands participating in Operation DEEP FREEZE 90/91 are listed, and their activities are described in sufficient detail to provide guidance for following years.

G-49482

Mellor, M., **Notes on Antarctic aviation, U.S. Army Cold Regions Research and Engineering Laboratory. Report, CR 93-14, Aug. 1993 145p., ADA-273 018, 16 refs.**

Antarctic aviation has been evolving for the best part of a century, with regular air operations developing over the past three or four decades. Antarctica is the last continent where aviation still depends almost entirely on expeditionary airfields and "bush flying," but change seems imminent. This report describes the history of aviation in Antarctica, the types and characteristics of existing and proposed airfield facilities, and the characteristics of aircraft suitable for Antarctic use. It now seems possible for antarctic aviation to become an extension of mainstream international aviation. The basic requirement is a well-distributed network of hard-surface airfields that can be used safely by conventional aircraft, together with good international collaboration. The technical capabilities already exist. (Auth.)

See also:
B-47595 B-47596 B-48243 B-48474 B-48663 B-48925 F-47693
F-47695 F-47697 F-47700 F-48047 F-48763 F-49088 F-49324
F-49357 I-47586 I-47710 I-47944 I-48554 K-47709 K-47778
K-47798 K-49308 L-47839

H. MEDICAL SCIENCES

H-47419

Gormly, P., **ANARE first aid manual (5th ed.)**, Kingston, Tasmania, Australian Antarctic Division, Sep. 1992, 82p.

This pocket size manual is designed as a ready reference to be carried on the person. First aid instructions are provided for both general medical emergencies and particularly cold-related emergencies such as hypothermia and frostbite. General emergencies include cardiopulmonary resuscitation, bleeding, shock, fractures, dislocations, sprains, head injuries, wounds, dehydration, and burns. An index of medical supplies and drugs is also included.

H-47485

Bendiksen, F.S., Molvaer, O.I., Reitehaug, P.I., **Norwegian Antarctic Research Expedition 1989-90—medical contingency, work and research** [Den norske antarktisekspedisjonen 1989-90—medisinsk beredskap, arbeid og forskning], *Tidsskrift for den Norske laegeforening*, 1991 111(30), p.3613-3618, In Norwegian with English summary. 10 refs.

The weather during the NARE-1989/90 summer expedition was pleasant, and the temperature seldom fell below - 30 C. The 35 persons in the land party included two physicians and one nurse. No serious injury or disease occurred. The participants seemed to experience an increase in lean body weight and loss of fat during 5 weeks in tents. Extensive data were collected for medical-psychological projects on immunology, adaptation to cold, and exhaustion from cold and stress. Some results have been published in separate reports. (Auth.)

H-47593

Rakov, A.L., Shatilo, A.I., **Influence of repeated wintering-over in Antarctica on cardiovascular diseases in personnel** [Vlianie povtornykh zimovok v Antarktide na vozniknovenie serdechno-sosudistykh zabolevaniïu poliarnikov], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.47-51, In Russian. 8 refs.

The relationship between prolonged exposure to antarctic harsh conditions and the pathogenetic mechanism of cardiovascular disorders in wintering-over personnel was studied. Results of tests carried out in 58 men (average age 51.3 y), who had participated in 3 or more wintering-over seasons, are discussed and presented in a table. Hormonal changes related to the adaptation syndrome were observed. It is suggested that the occurrence of endocrine and metabolic changes in the men tested indicates a predisposition toward cardiovascular pathology.

H-47594

Dmitriev, A.V., **Results of synchronous intercontinental biological experiments** [Nekotorye rezul'taty sinkhronnogo mezhkontinental'nogo biologicheskogo eksperimenta], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.51-54, In Russian.

During SAE-32, synchronous experiments using water-drinking animals (white rats) were carried out at Molodezhnaya Station, with a control group in Russia, to determine the biological effects of potable water on station personnel. The animals at Molodezhnaya, investigated between Apr. and Aug. 1987, were divided into 11 groups depending on the source of water used. Significant differences were

found in all basic parameters between the experimental and control groups, particularly concerning changes in the development of the permeability of erythrocytic membranes (PEM). PEM fluctuations, observed during magnetic disturbances at the higher latitude, resulted in decreased biological activity and the onset of functional deficiency.

H-47705

Owen, J., Arendt, J., **Melatonin suppression in human subjects by bright and dim light in Antarctica: time and season-dependent effects**, *Neuroscience letters*, 1992 Vol.137, p.181-184, 22 refs.

Full-spectrum light, of sufficiently high intensity, will suppress the secretion of melatonin at night in humans. Individual sensitivity to such suppression is variable, and the factors determining such sensitivity are largely unknown. By analogy with animal work, previous short or long-term exposure to different light intensities may be an important determinant. Groups of healthy men living on the British Antarctic Survey Base at Halley were exposed to dim (range 290-310 lux) and bright (2100-2300 lux) light either from 01.00-02.00 h or 05.00-06.00 h, both in winter and in summer. Plasma melatonin concentrations were determined by radioimmunoassay in serial blood samples taken before, during and after light treatment, and in control (darkness) conditions. Light suppression of melatonin was more effective in the latter part of the night in winter, and this was particularly well-differentiated for dim light. (Auth.)

H-48209

D'Alesandro, M.M., Lopez, A., Reed, H.L., Harford, R., **Indoor temperature variations in McMurdo, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.237-238, 8 refs.

A longitudinal study of meteorological and indoor temperature fluctuations, with emphasis on temperature gradients, experienced from head to foot during the 1989-1990 season by winter-over personnel at McMurdo Station is reported. The research station consists of approximately 100 structures that accommodate as many as 1,200 people during the austral summer, (Oct. to Jan.) and a small contingent of military and civilian personnel during winter-over operations (Feb. to Oct.). The winter-over personnel stay year-round. Changes in the temperature gradient from head to foot were much greater during the Jan. 1990 period than during the Aug. 1990 period. This temperature gradient experienced by antarctic residents may induce a subtle heat loss through the lower extremities. Physiological changes in response to this type and duration of subtle cold stimulus require further study.

H-48210

Reed, H.L., D'Alesandro, M.M., Harford, R., **Polar T3 syndrome: meaning for midlatitude residents**, *Antarctic journal of the United States*, 1991 26(5), p.239-240, 5 refs.

Recent studies of *in vitro* binding assays of white blood cell nuclear T3 receptors carried out at McMurdo Station from 1989 to 1990, combined with other *in vitro* kinetic tests, helped characterize the time course and mechanism of the polar T3 syndrome. In the group of antarctic residents (1989-1990) (2 women, 7 men), monthly pharmacologic kinetic studies were done and the data compared to the subjects' predeployment study in California. Additionally, the mononuclear T3 receptor (NT3R) was isolated and its kinetic parameters defined from 23 subjects during the study to clarify the particular type of tissue receptor involved in this process. The polar T3 syn-

drome is not restricted to Antarctica; similar changes in thyroid economy are present in both midlatitude seasonal flux and arctic field operations. The time course of T3 kinetic changes is on the order of months while in polar residence, but it is likely that some changes occur within weeks.

H-48211

Palinkas, L.A., Browner, D., **Stress, coping, and depression in U.S. Antarctic Program personnel**, *Antarctic journal of the United States*, 1991 26(5), p.240-241, 13 refs.

The objective of this study was to determine whether certain personality characteristics and coping resources and responses known to be associated with the severity of depressive symptomatology prior to deployment to Antarctica may also be used to predict for depression after one or more seasons on the ice. Subjects for this study were 234 men and women who were members of the U.S. Antarctic Program in 1988 and 1989. Physical and mental health status were evaluated on the basis of responses to the "Health and Daily Living Form" (HDL). The association between baseline measures of personality, stress, and coping resources on the one hand and responses and depressive symptomatology on the other, both at baseline and at year 1, was assessed by means of Pearson product-moment correlations. In all personnel, an external locus of control, increased stressful life events, and use of avoidance and active-cognitive methods of coping and information seeking, affective regulation, and emotional discharge as a focus of coping, predicted for depression at the end of the year.

H-48296

Bachelard, C., Rivolier, J., **International Biomedical Expedition to the Antarctic [I.B.E.A.]**, *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.53-58, In French.

The 3 general aims of the International Biomedical Expedition to the Antarctic, carried out in the summer of 1980-1981, are summarized: to determine the extent of human psychological adjustment to cold, to measure the effects of cold and isolation on physical and mental performance, and to study interpersonal relationships under stressful conditions. Results show that, in organizing an expedition, it is more important to verify the participants' psychological adaptation than the physiological one.

H-48461

Palinkas, L.A., **Going to extremes: the cultural context of stress, illness and coping in Antarctica**, *Social science and medicine*, Sep. 1992 35(5), p.651-664, 76 refs.

The question of whether the concept of adaptation remains useful in medical anthropology is examined in the context of the human experience in Antarctica. This experience is characterized by prolonged isolation, confinement, and exposure to extreme environmental conditions. Men and women who winter-over at scientific research stations often exhibit a complex of psychophysiological symptoms in response to these stressors. However, this experience also appears to provide long-term health benefits. It is argued that the psychological symptoms are themselves part of the process of coping and do not necessarily represent an inability to adapt to the extreme environment. Coping is viewed as a process of negotiation leading to a compromise between individual and group needs. The cultural systems of antarctic research stations are both a product of this negotiation and a set of normative and pragmatic rules regulating the process. Further, this process fosters the acquisition of new strategies or resources for coping with subsequent stressful experiences. (Auth.)

H-48463

U.S. National Aeronautics and Space Administration, **Epidemiologic research in Antarctica**, NASA/NSF Biomedical Polar Research Workshop Minutes, Washington, D.C., Oct. 11-12, 1990, Washington, D.C., 1990, 22p. N93-16800.

A study of epidemiology of respiratory viruses that was begun in the early 1960s is described. Locations selected for the study included a Wisconsin University housing village, a second grade school population, individual volunteers who associated socially, married couples, and the winter-over population at McMurdo Station and at Scott Base in the Antarctic. It was concluded that most rhinovirus transmission is through aerosolized particles. Air filtration and careful nasal sanitation with virucidal tissues are determined to be effective in blocking rhinovirus transmission, and should be useful in both isolated space colonies and in ordinary earth-bound populations. (Auth.)

H-48464

Meehan, R.T., **Immunology presentation at the 1990 NASA/NSF Antarctica Biomedical Science Working Group**, NASA/NSF Biomedical Polar Research Workshop Minutes, Washington, D.C., Oct. 11-12, 1990, Washington, D.C., 1990, 4p., N93-16806, 5 refs.

An overview of methodology used for determining human *in vitro* lymphocyte activation, proliferation and effector cell function was presented, and results of previous manned space flight immunology studies from Apollo through Shuttle were reviewed. These studies are particularly pertinent to Antarctica, since the altitude equivalent of 11,000 ft at the South Pole may affect some of the variables that are being measured in immunology, physiology or cognitive studies. An extravehicular study was performed, drawing blood from 35 individuals before and immediately following a chamber exposure study. Preliminary results from 30 Shuttle astronauts investigated immunophenotype analysis and the role of a novel monocyte population in modulating the previously observed suppressed *in vitro* immune function. The results of the Air Force Academy cadet stress study were also presented. (Auth. mod.)

H-48754

Muchmore, H.G., Scott, E.N., Parkinson, A.J., **Human infectious diseases**, Antarctic microbiology, edited by E.I. Friedmann, New York, Wiley-Liss, Inc., 1993, p.571-592, Refs. p.589-592.

During the long period of winter isolation (typically from mid-Feb. to about Nov. 1, when low temperature and darkness prevent air transport), travel to and from the antarctic bases stops, as does all opportunity for outside contact. The microbiological and immunological events that occur in the course of this isolation were studied. Because information is so limited, the authors examine it in a partly chronological fashion rather than a purely expository manner, and attempt to identify the significant research-derived threads that can be woven into the developing fabric of understanding of the basis of "normal" human microbiology and immunology. The observations discussed in this chapter took place during small-group isolation in a cold, relatively sterile environment with a sharply altered day-night cycle. It is tentatively concluded that, with reasonable nutrition and housing, the physical health of humans isolated in the Antarctic is uniformly good. There is no evidence that the changes that occur during isolation pose serious problems when the isolation periods ends.

H-48820

Ancic C., P., Guzmán T., M., Oyarzún G., M., **Respiratory symptoms and pulmonary function in personnel of Bernardo O'Higgins Station** [Síntomas respiratorios y función pulmonar en residentes de la base antártica O'Higgins], *Revista médica de Chile*, 1993 121(3), p.247-252, In Spanish with English summary. 20 refs.

Pulmonary function and physical capacity and their relation to respiratory symptoms were studied in military personnel, before and after one year of residence at the Bernardo O'Higgins Station. In 21 men aged 38 +/- 5.5 years, inquiries about smoking habits and respiratory symptoms, spirometry, bronchial provocation test and measures of aerobic capacity and peak expiratory flow were performed. After 75 days on the base, there was a significant increase in weight, exertional dysnea appeared in 8 subjects, and there was an 8.4% decrease in aerobic capacity. The bronchial provocation test was positive outdoors in 7 of the 21 staff members; when performed indoors, no subject had a positive test. After 7.5 and 11 months of residence, vital force capacity decreased by 13%; no diurnal differences of peak expiratory flow were observed. (Auth. mod.)

H-48821

Bouvel, B., Abraham, A., Rivolier, J., **Systemic study of a wintering group on Kerguelen Is.** [Etude systématique d'un groupe d'hivernage aux îles Kerguelen], *Psychologie médicale*, Feb. 1991 23(2), p.134-140, In French with English summary. 14 refs.

Group processes were studied in wintering over personnel—technicians and scientists, average age 31 years—on Kerguelen Is. The MPIG model for exploring intra- and inter-individual processes in groups was applied 3 times during the course of the winter, to obtain a standardized measure of latent tensions in the group matrix. Non-parametric methods were used to compare the findings of the MPIG with usual sociometric data. Comparable results were obtained in several areas, particularly in the group defense mechanisms or group attitude toward the leader. It was observed that the internal image of the group carried by individual members was altered in the light of the need to survive.

H-48926

Hanson, J.R.W., **Selection and management of British antarctic personnel for prolonged service in Antarctica**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.61-78, 2 refs.

The British Antarctic Survey (BAS) is the only antarctic operator which routinely overwinters personnel for two consecutive years. The BAS stations have wintering populations of between 3 and 20 personnel and are completely isolated for periods of up to 10 months. Accommodation is quite restricted in size with limited individual living space. There is a particular need for self discipline and consideration for others whilst in the Antarctic. It is therefore essential when selecting staff to recruit those who will form a team which is well balanced, both in respect of technical skills and, arguably more important, as a social unit. Alongside technical capability, other factors considered include character, age and marital status. The processes of selection, medical screening, pre-tour briefing and training are examined. (Auth. mod.)

H-48927

Catalano, F., Giuliani, P., **Medical and health aspects of the Italian antarctic programme**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.79-88.

This paper describes how the problems of health care have been addressed by the Italian National Research Program in Antarctica, including the medical selection of personnel, the characteristics desirable in medical and paramedical personnel, medical facilities and medical supplies, and the need for a measure of standardization among antarctic bases. Types of charts proposed for different medical emergencies are presented, as well as diving rules which were formalized in 1989. Also, a brief outline of the training program for prospective participants and the communication network of the Italian expeditions are given.

H-48928

Dalmau, T., **Cultural change by remote control—Reflections on changing the dynamics of antarctic communities**, Symposium on Antarctic Logistics and Operations, 5th, San Carlos de Bariloche, Argentina, 1992. Proceedings. Edited by O. Melander and L.R. Fontana, Buenos Aires, Dirección Nacional del Antártico, 1993, p.89-121, 21 refs.

In discussing the role of station leader in Antarctica, two key issues are pointed out: how to maintain a balance between the needs of the community and the outputs required by the organization and, secondly, how to maintain an effective and motivated team of people who meet standards of accountability, ethics, law, personal behavior (including alcohol) and the avoidance of sexual harassment whilst meeting obligations as a manager to the organization. In examining group dynamics, the emphasis remains on leading and maintaining a group of people in a series of different yet related endeavors in a physically hazardous environment, when the individuals concerned may not necessarily share the same values about behavioral standards with one another, and often not with the sponsoring organization.

H-49198

New Zealand. Ministry of Foreign Affairs and Trade. NZAP, **Antarctic first aid manual**, Christchurch, 1993, 67p.

In 22 sections advice is given for initial treatment of a wide variety of trauma, including accidents, EAR/CPR situations, bleeding and wounds, shock, cold injuries, burns, fractures, sprains, poisoning, wind chill, and eye and skin injuries. Also discussed are dental health, medications, injections, and various medical kits assembled for antarctic conditions.

H-49305

New Zealand. Ministry of External Relations and Trade. NZAP, **Antarctic first aid manual**, Christchurch, 1992, 67p.

In 22 sections advice is given for initial treatment of a wide variety of trauma, including accidents, EAR/CPR situations, bleeding and wounds, shock, cold injuries, burns, fractures, sprains, poisoning, wind chill, and eye and skin injuries. Also discussed are dental health, medications, injections, and various medical kits assembled for antarctic conditions.

See also:

B-47747 B-47748 B-49151

I. METEOROLOGY

I-47377

Egan, W.G., Hogan, A.W., Zhu, H., **Physical variation of water vapor, and the relation with carbon dioxide**, *Geophysical research letters*, MP 3173, Dec. 1991 18(12), p.2245-2248, 30 refs.

Analysis of the long-term NOAA carbon dioxide flask sample records to examine the exchange among the continental antarctic air mass and other air masses shows a meteorological variation of carbon dioxide concentration. There is an inverse relation between the seasonal variation of carbon dioxide concentration and water vapor at all stations examined. Well established diffusion coefficients indicate an interaction of water and carbon dioxide vapor on the molecular scale. Laboratory experiments using a Fourier transform spectrometer show carbon dioxide to be removed from an airstream in proportion to water vapor precipitated. The authors propose that interaction of carbon dioxide and water vapor in the atmosphere provides temporary sinks that can influence the balance of the carbon dioxide budget.

I-47381

Ivanova, I.N., **Results of investigating the middle atmosphere at antarctic station Molodezhnaya**, *Soviet meteorology and hydrology*, 1991 No.5, p.30-34, Translated from *Meteorologiya i gidrologiya*. 9 refs.

This paper analyzes data on air temperature and wind obtained at Molodezhnaya Station in 1969-1988 and on Heiss I. in 1964-1988. It was found that during these periods virtually the entire middle atmosphere had been cooled. Differences in the behavior of amplitudes and phases of semiannual, annual and 11-year variations are apparently caused by more intensive dynamic processes in the Northern as against the Southern Hemisphere. An analysis is made of the relative variations in total ozone and air temperature, and of the absolute values of wind components observed at Molodezhnaya in 1987-1988. The absence of the spring ozone minimum in 1988 in contrast to 1987, and the difference in the mean vertical wind speed apparently resulted from an intensification of dynamic processes over the Antarctic in 1988. (Auth. mod.)

I-47384

Parish, T.R., **On the role of antarctic katabatic winds in forcing large-scale tropospheric motions**, *Journal of the atmospheric sciences*, Aug. 1, 1992 49(15), p.1374-1385, 15 refs.

Katabatic winds are a dominant feature of the lower atmosphere over Antarctica. The radial diffuence displayed by the drainage flows implies that a continental-scale subsidence is present. From mass continuity considerations, a thermally direct meridional circulation must become established. The upper-level convergence above the antarctic continent acting to feed the katabatic circulation generates cyclonic vorticity in the middle and upper troposphere. Model simulations show that a robust circumpolar circulation becomes established within a time scale of about a week. The adverse horizontal pressure gradients in the upper atmosphere result in a gradual decay of the low-level katabatic circulation. The katabatic wind regime appears to be an important forcing mechanism for the circumpolar vortex about the periphery of the antarctic continent. (Auth.)

I-47385

Colacino, M., ed, Giovanelli, G., ed, Stefanutti, L., ed, **Italian Research on Antarctic Atmosphere**, 3rd Workshop, Porano, Oct. 22-24, 1990, **Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.34**, Bologna, Italian Physical Society, 1992, 390p., Refs. passim. For individual papers see A-47386, A-47401, I-47387 through I-47400, I-47402 through I-47413 and K-47414 through K-47417.

This is a collection of papers presented at the 3rd Workshop of Italian Research on Antarctic Atmosphere, held Oct. 22-24, 1990, in Porano, Italy. It consists of more than 30 reports, divided into 4 sections: 14 papers dealing with the troposphere and meteorology; 4, in instrumentation dealing with the new ozone lidar; 9, in climatology and antarctic stratosphere, with emphasis on the ozone hole; and 4, dealing with the magnetosphere.

I-47387

Pellegrini, A., De Silvestri, L., Grigioni, P., Sarao, R., **Mesoscale meteorology at Terra Nova Bay Station: operational aspects and some climatological results**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.19-33, 6 refs.

Meteorological measuring systems and computing facilities, installed and tested at Terra Nova Bay Station, are described. Almost all the instruments and systems proved to work properly in the antarctic environment. The systems have provided valid data, which have been used for operational and scientific purposes. The overall structure of the systems is explained, and some examples of climatological post-analysis are presented. (Auth.)

I-47388

Cogliani, E., Pellegrini, A., Racalbuto, S., **Analysis of antarctic data, Feb. 1987-Aug. 1990**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.35-47.

Data from a small network of automatic weather stations (AWS), collected from Feb. 1987 to Aug. 1990, are presented. The principal meteorological parameters (pressure, temperature, wind) are shown. Particularly strong winds (wind speed greater than 50 kt) are noted. A simple explanatory pattern of antarctic circulation, including katabatic wind, is proposed. (Auth.)

I-47389

Frustaci, G., Bacci, G., Pellegrini, A., **Mesoanalysis and operational weather forecast for the western Ross Sea**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.49-64, 9 refs.

Based on data collected from various automatic weather stations, mesoscale analyses of the surface conditions on littoral Victoria Land and the western Ross Sea were carried out in the summer of 1988-1989. A general conceptual model is discussed for correct interpretation of such analyses, with the conclusion that mesoanalysis allows for more reliable forecasting. Some suggestions are made regarding the installation of additional meteorological instruments for improved data gathering in the area.

I-47390

Baldi, M., Dalu, G.A., Colacino, M., Guerrini, A., **Part 1: surface wind field in the interior of the antarctic continent**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.65-72, 11 refs.

The authors extend Ball's (1960) analytical theory for the drainage surface atmospheric flow over the interior of the antarctic continent to include diabatic perturbations, blocking due to presence of isolated mountains, and channeling in narrow valleys. In order to avoid limitations due to grid resolution, the theory is kept analytical, therefore solutions are continuous and feasible over large geographical areas on computers of limited power. (Auth.)

I-47391

Baldi, M., Dalu, G.A., Colacino, M., Guerrini, A., **Part 2: organized criticality of the surface atmospheric flow in the near-coastal regions of Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.73-78, 14 refs.

The authors give a theory for the katabatic winds in near-coastal regions of Antarctica in terms of the mesoscale energy theory developed by Dalu and Green (1983). An analysis of the behavior of the dynamical system associated with the model shows that katabatic winds in near-coastal regions can be periodic or continuous, or can stay a long time in a quiescent near-critical state, to burst in short and strong gusts. This complex behavior is described by a non-linear equation which links the depth and the intensity of the dense current to the inflow from the interior, the slope of the terrain and the diabatic cooling. The theory agrees with qualitative and quantitative features observed *in situ*. (Auth.)

I-47392

Fantini, M., Buzzi, A., **Numerical experiments on a possible mechanism of cyclogenesis over the circum-antarctic ocean**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.79-89, 9 refs.

The presence of mesoscale (100-1000 km) vortices over the oceans that surround the antarctic continent has been revealed by satellite pictures. The observed characteristics put them in the same class with those 'Arctic lows' that have been interpreted by Emanuel and Rotunno (1989) as a form of Arctic hurricane. The theory for this kind of phenomenon requires a finite amplitude initiator for the development. The authors show that in the circum-antarctic environment, baroclinic instability can act as a trigger for the organized convective activity of the Emanuel-Rotunno theory, even when the length scales involved are not baroclinically unstable. Strong mesoscale updrafts are maintained by latent and sensible heat transfer from the surface of the ocean, which is assumed to be considerably warmer than the air above. (Auth.)

I-47393

Crescentini, G., **In situ and laboratory measurements of the tropospheric concentration of chlorofluorocarbons in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.91-98, 15 refs.

Data on chlorofluorocarbon concentration in ground-level atmosphere in Antarctica, obtained during the 1989-90 expedition, are reported. Samples collected at different locations in Terra Nova Bay were analyzed in the laboratory by gas chromatography-mass spectrometry, while *in situ* measurements were carried out by gas chromatography with electron capture detection. Instruments and the analytical methodologies employed for the determination of CFCs and some chlorinated hydrocarbons are described.

I-47394

Taviani, M., **Problem of airborne microspherules collected at Terra Nova Bay: natural or anthropogenic?**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.99-110, 42 refs.

Microspherules of micron-submicron size represented a recurrent component of 1988 summer eolian dust collected by mesh-panels in Terra Nova Bay. Most spheres have a distinct Al-Si-Fe composition, but whether they originated from anthropogenic or natural (volcanic) sources cannot be ascertained at present. Other spherical particles include Ca- and Au-spherules, also of uncertain origin, and carbonaceous pollutants. All spherules are probably related to local sources. (Auth.)

I-47395

Santachiara, G., Bonasoni, P., Prodi, F., **Individual particle analysis of antarctic aerosols**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.111-124, 24 refs.

Aerosol particles were sampled during Jan.-Feb. 1990 at Terra Nova Bay by high flowrate spectrometer, and their chemical composition was determined. The four examined filters showed that for particles with R equal to or greater than 0.5 micron, the sea-salt number is prevalent. In some cases a chlorine loss in sea-salt particles from marine droplets was observed. This phenomenon may depend on liquid-phase SO₂ oxidation, and production of sulphate with Cl ions as catalyzer, which may result in the following reaction: H₂SO₄ + NaCl = Na₂SO₄ + HCl. (Auth.)

I-47396

Tomasi, C., Vitale, V., Zibordi, G., **Multi-wavelength sun-photometric measurements of atmospheric turbidity parameters at Terra Nova Bay during Jan. 1990**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.125-142, 25 refs.

Direct solar irradiance measurements were routinely taken at 7 visible and near-infrared wavelengths centered within the main windows of the atmospheric transmittance spectrum with the sun-photometer, model FISBAT, at Terra Nova Bay Station during Jan. 1990. These measurements were first corrected to minimize sky diffuse radiance errors and then analyzed to calculate the calibration constants through a procedure based on the Langley plot method. Accurate values of the aerosol particle optical thickness were obtained from these measurements and examined in terms of Ångström's formula to determine the atmospheric turbidity parameters alpha and beta. Results show that the mean daily values of alpha vary between 0.42 and 1.36, presenting a median value of 0.97 and quartiles of 0.81 and 1.15, while the mean daily values of beta were found to range between 0.010 and 0.036, with a median value of 0.026 and quartiles of 0.013 and 0.030. A comparison of the present results with those obtained in 1988 and 1989 clearly indicates that during Jan. 1990, parameter alpha presented very similar features to those found in the previous years, while parameter beta assumed intermediate values. (Auth. mod.)

I-47397

Anav, A., **Aerosol optical depth in Antarctica: the Rayleigh scattering contribution in the UV**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.143-147, 5 refs.

New measurements taken with a 6 wavelength sun-photometer at Terra Nova Bay in Jan. and Feb. 1990 show that Rayleigh coefficients

commonly used in aerosol optical depth evaluations lead to negative values even when extraterrestrial calibrations are accurately checked. This happens particularly in the UV region of wavelengths used. A tentative technique for recovering data taken is reported. The Rayleigh coefficients adopted are 20 to 30% smaller than standard ones at these wavelengths. (Auth.)

I-47398

Zibordi, G., Meloni, P., **Non cosine response of optics in the evaluation of bi-hemispherical reflectance of antarctic surfaces**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.149-157, 11 refs.

Bi-hemispherical reflectance of earth's surfaces is an important parameter in climatology because of its role in the energy exchange between atmosphere and biosphere. Experimental values of bi-hemispherical reflectance can be obtained by irradiance measurements performed with 2 pi steradian radiometers, provided that the non-cosine response of optics, which could strongly affect the retrieved bi-hemispherical reflectance as a function of the sun zenith, is accounted for in data analysis. By simulating irradiance measurable with a 2 pi steradian non-cosine collector radiometer, accounting for the angular transmission function of optics and sky radiance non-isotropy, theoretical factors have been computed to correct the bi-hemispherical reflectance obtained from irradiance measurements. The description of the correction methodology and retrieved bi-hemispherical reflectance of representative Victoria Land surfaces are given. (Auth.)

I-47399

Mastrantonio, G., Ocone, R., Argentini, S., Fiocco, G., **Interaction of gravity driven flows at Nansen Ice Sheet**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.159-166, 13 refs.

During the 1988-89 summer expedition, a three-axis Doppler sodar system was deployed on the Nansen Ice Sheet, a large flat area at the confluence of the Reeves and Priestley glaciers, and ran continuously for about 45 days. The observations show a larger degree of variability in comparison with those recorded during the previous year at the base site. The direction of arrival and the structure of the wind profile reflect the orientation of the axes of the two glaciers and the merging of the two air currents. Some statistical analyses of the collected data are presented, together with examples of the wind field observed. Episodes of the interaction between flows coming from the two glaciers are also discussed. (Auth.)

I-47400

Morandi, M., **Tropospheric cloud characterization: the ECLIPS campaigns**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.167-175, 4 refs.

During the 1989 lidar study of tropospheric clouds at Dumont d'Urville Station, lidar cloud measurements were performed in the frame of the international program ECLIPS in two campaigns: Apr. 1-Apr. 30 and Sep. 15-Oct. 31. In this paper the lidar limitations are discussed, and the processing programs and the measured parameters are described.

I-47402

Castagnoli, F., **New lidar systems: the DIAL, first calibration campaign at OHP; the automatic backscattering system, state of the art**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.185-203, 7 refs.

A detailed description of the IROE and SA-CNRS lidar for tropospheric and stratospheric ozone measurements, assembled in June 1990, is presented. The various subsystems, the reliability of the lasers and the acquisition electronics were tested, and the results are discussed. Also described is the automatic backscattering lidar.

I-47403

Bonasoni, P., Evangelisti, F., Giovanelli, G., **O₃ and NO₂ absorption cross section measurements by multipath spectrophotometer**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.205-211, 7 refs.

The measurements of the absolute absorption cross sections of O₃ and NO₂ in the wavelength ranges 295.0-345.0 nm and 400.0-460.0 nm respectively, were measured in laboratory at room temperature. They were taken by a spectrophotometer with variable multipath cell. This paper discusses the instrumental setup and the processing procedures employed in measuring the O₃ and NO₂ differential absorption cross sections. The resulting values were subsequently fed into the computing programs of the O₃ and NO₂ vertical column amounts that were measured by DOAS (Differential Optical Absorption Spectrometer, called "GASCOD") during the last two Italian scientific expeditions to Antarctica, 1988-1990. (Auth. mod.)

I-47404

Georgiadis, T., Giovanelli, G., Bonasoni, P., **Energy-balance and surface layer measurements in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.213-218, 11 refs.

This paper reviews studies of the physical behavior of the atmospheric surface layer of Antarctica and the energy balance related to the turbulent fluxes of scalar quantities as calculated by the Monin-Obukhov similarity theory. A broad range of analytical results are examined, along with the instruments used in formulating for future national expeditions in Antarctica a new Energy Balance Remote Station. This is designed to provide for iced over and ice-free areas a complete set of micrometeorological data capable of assessing all the terms of the energy balance equation. (Auth.)

I-47405

Kurylo, M.J., **International efforts in the study of stratospheric ozone depletion: a 1990 status report**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.221-226, 11 refs.

A review is presented of research projects, organizations and instruments involved in studying stratospheric ozone changes both in Antarctica and in the Arctic. It is pointed out that in large part, this research has been motivated by the desire to understand the response of stratospheric ozone to the atmospheric emission of trace gases from both natural and anthropogenic sources, and thereby to predict the possibility and scope of future ozone perturbations.

I-47406

Tomasi, C., Vitale, V., Gasperoni, L., Marani, S., **Ozone absorption and Rayleigh scattering features in sun-photometric measurements taken at ultraviolet wavelengths**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.227-245, 27 refs.

The solar ultraviolet radiation measurements taken at the Terra Nova Bay Station in both 1988 and 1989 with the sun photometer, model UVISIR, were examined by separately calculating the various attenuation effects produced by atmospheric gases, Rayleigh scatter-

ing and aerosol particles. The sun photometric output voltages were first corrected for the sky-diffuse radiance errors and then for the extinction effects produced by nitrogen dioxide, sulphur dioxide and airborne aerosol particles so as to determine the output signals attenuated by Rayleigh scattering and ozone absorption only. On the basis of results obtained, an empirical method is proposed for measuring the short-time changes in vertical atmospheric content of ozone using the sun photometric measurements routinely taken within one of the ultraviolet wavelength intervals. (Auth. mod.)

I-47407

Stefanutti, L., **Two years of monitoring of the antarctic stratosphere by means of lidar at the French Base of Dumont d'Urville**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.247-260, 4 refs.

Measurements of background aerosols and polar stratospheric clouds were carried out by means of a depolarization backscattering lidar at Dumont d'Urville Station during 2 years. No evident change in the background aerosols was observed during that period. PSCs appeared during the months of July and Aug. and in a few cases in Sep. From the combined analysis of the backscattering ratio, the depolarization ratio and the Rawinsonde data, the clouds were classified as follows: nitric acid trihydrate Type Ia and Type Ib clouds, and Type II water ice clouds. (Auth. mod.)

I-47408

Flesia, C., Mugnai, A., Stefanutti, L., **Lidar depolarization by nonspherical particles**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.261-269, 7 refs.

The potential of combined backscatter and depolarization information for deriving the optical parameters of clouds together with size and physical phase of the cloud particles was investigated. Some tests on the simulated lidar return were carried out in order to investigate the influence of cloud particles deformation and orientation on the parallel and perpendicular backscattered intensities, and on the depolarization ratio under experimental noise conditions. (Auth.)

I-47409

Di Girolamo, P., **Ice clouds in the antarctic stratosphere: evidence for water removal**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.271-275, 10 refs.

Clouds form in the antarctic stratosphere during the winter season when the temperature drops below approximately 200K. Clouds composed of nitric acid hydrates (Type I) appear at temperatures a few degrees above the water ice point. Water ice clouds (Type II) start forming as soon as saturation conditions are reached. Lidar echoes obtained at South Pole have been studied and a criterion for distinguishing Type II from Type I clouds based on the sensitivity of backscattering to temperature has been applied. Water vapor vertical profiles in the presence of clouds have been inferred, and evidence for the water vapor removal by the clouds is discussed. (Auth.)

I-47410

Anav, A., Ciattaglia, L., Guerrini, A., Valenti, C., **Use of the Brewer spectrophotometer in measurements of total O₃, SO₂, NO₂, UVB and for Umkehr profiling**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.277-284, 3 refs.

The use of the Brewer spectrophotometer in Antarctica and in Rome is discussed. Measurements taken at Scott Base show evidence of an ozone hole during the period of Sep.-Oct. every year. Contemporary data, also taken at other sites in Antarctica, confirm

values as low as 130-150 D.U. The results of a new program made by A.E.S. (Canada) based on an inversion technique (Umkehr) are shown for Rome and some vertical profiles of ozone are reported. Some data for total SO₂ and ozone are examined with the aim to interpret the characteristics of the air pollution due to urban sources. (Auth.)

I-47411

Pitari, G., Palmeri, S., Visconti, G., **Stratospheric GCM for polar ozone studies: a progress report**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.285-316, 31 refs.

A progress report is given on the upgrading of a general circulation model of the stratosphere in view of its use for polar ozone studies. Particular emphasis is given to the explicit and detailed parameterization of diabatic processes in the lower stratosphere, in substitution of a simple thermal relaxation law that was present in the original version of the model. Problems connected with spatial truncation and ozone transport are also taken into account. As a result a much better simulation of the stratospheric dynamics is obtained (for example, the closure of the upper stratospheric jet) as well as a noticeable improvement in ozone transport. Finally, a first experiment of polar ozone depletion through heterogeneous processes has been made using a simple parameterization of these chemical reactions. (Auth.)

I-47412

Pitari, G., Visconti, G., Verdecchia, M., Mancini, E., **Antarctic temperature perturbation due to the QBO and the secular ozone trend**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.317-329, 28 refs.

A study of the temperature perturbation associated with ozone depletion in the antarctic region was made with a two-dimensional model of the stratosphere and troposphere. The thermodynamic equation is solved using a diabatic forcing which includes the difference of the radiative heating due to ozone absorption of solar radiation with respect to a reference unperturbed case. The same approach has been used to evaluate the high-latitude temperature oscillation introduced by the QBO of the equatorial zonal winds. A significant feedback of ozone on stratospheric temperatures is shown which could have important consequences in the frequency of occurrence for both type 1 and type 2 polar stratospheric clouds. (Auth.)

I-47413

Pitari, G., **Role of sulfate aerosols in the stratospheric ozone climatology**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.331-347, Refs. p.346-347.

A 2D model has been used to study the effects of sulfate aerosols on stratospheric ozone. The authors have included in their study background and volcanic aerosols, using different scenarios. The model includes a complete chemical code for both homogeneous and heterogeneous reactions; the basic temperature field is prescribed, while the perturbation introduced by the presence of volcanic aerosols is explicitly predicted. A *delta*-Eddington approximation is used to evaluate the photodissociation rates with aerosols present. It is shown that the partition inside ClO_y and NO_y families is a key point to assess the potential O₃ destruction induced by the presence of sulfate aerosols. Increase of total chlorine in the stratosphere causes a well-known ozone depletion by itself, but the effects could be highly enhanced in the presence of a large amount of volcanic dust, which can also produce different equilibria in the NO_y and ClO_y reservoirs. (Auth.)

I-47424

Kasting, J.F., **Paradox lost and paradox found**, *Nature*, Feb. 20. 1992 355(6362), p.676-677, 12 refs.

The author points out and discusses this reversal in scientific thought: reduced solar luminosity in the past, once perceived as a problem, has been recast as a solution; meanwhile, increased atmospheric CO₂, once seen as solution, is now viewed as a problem. How this will eventually work out depends on whether a CO₂ paleobarometer method proves able to produce self-consistent reproducible results.

I-47425

Kotliakov, V.M., **Global changes in the environment as "mirrored" in an ice core** [Global'nye izmeneniia prirody v "zerkale" ledianogo kerna], *Priroda*, July 1992 No.7, p.59-68, In Russian.

Ice cores extracted at Vostok Station are analyzed. The discussion includes age and temperature of the ice, atmospheric precipitation, aerosols, and anthropogenic impact on atmospheric composition.

I-47431

Xiong, K., Hu, R.M., Shi, G.Y., **Antarctic total ozone change correlated to the stratosphere wind and temperature during the polar night**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.45-50, In Chinese with English summary. 10 refs.

Analysis of total amount of ozone variation, and its relation to the wind speed temperature and the rate of temperature change at 50 hPa height over Showa Station during the polar night in 1987, is made by using the total amount of ozone and upper air data at Showa Station from 1982 to 1987. It is found that there is a good coherence between total amount of ozone and the wind speed at 50 hPa height during the polar night. According to the principle of thermal wind, the authors calculated the thermal advection during the polar night in 1987. A good coherence between total amount of ozone and the thermal advection at 50 hPa height was found, also that the temperature variation was caused by thermal advection. It is suggested that stratospheric ozone does not have a significant air heating function. (Auth. mod.)

I-47432

Huang, Y.R., **Analysis of the summer sea fog of Drake Passage**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.51-58, In Chinese with English summary. 3 refs.

Analysis of sea fog in the Drake Passage region, based on meteorological and hydrological data obtained during the 3rd Chinese Antarctic Research Expedition and on weather charts compiled by the Felac Meteorological Center in Argentina, shows that the summer advection-cooling fog prevailing in this area has a long-term time scale, a high frequency and a close correlation with the wind field. Charts of several weather patterns showing fog occurrence and the distribution of other weather elements, which can be used in fog forecasting in the Drake Passage, are presented.

I-47440

McFarlane, N.A., Boer, G.J., Blanchet, J.P., Lazare, M., **Canadian Climate Centre second-generation general circulation model and its equilibrium climate**, *Journal of climate*, Oct. 1992 5(10), p.1013-1044, 45 refs.

The Canadian Climate Centre second generation general circulation model is described. Important features of the new version include an interactive cloudiness parameterization, improved solar and terrestrial radiative heating calculations, a more sophisticated treatment of land surface processes, and a simple ocean mixed-layer model with a thermodynamic sea ice component. Results from a ten-year

climate simulation made with the new model are presented and compared with observed climatology. The comparison is made for the Dec.-Feb. and June-Aug. periods. The model reproduces the observed climatology in a generally successful manner. Included are simulated snow volume and sea ice thickness variations on and surrounding Antarctica. (Auth. mod.)

I-47441

Boer, G.J., McFarlane, N.A., Lazare, M., **Greenhouse gas-induced climate change simulated with the CCC second-generation general circulation model**, *Journal of climate*, Oct. 1992 5(10), p.1045-1077, 39 refs.

The Canadian Climate Centre second-generation atmospheric general circulation model coupled to a mixed-layer ocean incorporating thermodynamic sea ice is used to simulate the equilibrium climate response to a doubling of CO₂. The results of the simulation indicate a global annual warming of 3.5 C with enhanced warming found over land and at higher latitudes. Precipitation and evaporation rates increase by about 4%, and cloud cover decreases by 2.2%. Soil moisture decreases over continental Northern Hemisphere land areas in summer. The frozen component of soil moisture decreases and the liquid component increases in association with the increase of temperature at higher latitudes. The simulated accumulation rate of permanent snow cover decreases markedly over Greenland and increases slightly over Antarctica. Seasonal snow and sea ice boundaries retreat, but local decreases in planetary albedo are counteracted by tropical increases, so there is little change in the global average. Large-scale patterns of change are found in mean sea level pressure accompanied by a general decrease in short-term variability. (Auth. mod.)

I-47490

Kodama, M., Kohno, T., Kanzawa, H., **Stratospheric sudden cooling after solar proton event over Syowa Station, Antarctica**, *Journal of geomagnetism and geoelectricity*, 1992 44(5), p.361-366, 14 refs.

Forty-three solar proton events (SPEs) with energies of greater than 30 MeV, whose time-integrated proton flux throughout an event is above 10,000,000/sq cm, are selected from 4 solar cycles of 1956 to 1990, and their influence on the lower stratospheric temperature was investigated by using radiosonde data from Showa Station. It is shown that 64% of the 33 SPEs in which the radiosonde data were available are followed by a sudden cooling of -2.4 C on average at 20-30 km altitude. Also 69% of the 13 SPEs recorded proton flux above 100,000,000/sq cm, giving a mean value of -3.5 C. Fifteen events accompanied with the GLE (Ground Level Enhancement, with the order of GeV protons) exhibit significant coolings, while two do not. (Auth.)

I-47506

Stefanutti, L., **Italian program in Antarctica, related to the ozone hole problem and the experimental cloud lidar pilot study**, *Optoelectronics for environmental sciences*, edited by S. Martellucci and A.N. Chester, New York, Plenum Press, 1991, p.61-76, Proceedings of the 14th Course of International School of Quantum Electronics. 15 refs.

Since Jan. 1988 an Italian backscattering lidar has been operating in Antarctica, at the Italian base of Terra Nova Bay during the summer 1988 and now at Dumont d'Urville. The system was built by the research group of IROE of CNR, within a broad research program on atmospheric studies carried out by the Italian National Program for Antarctic Research. Among the principal objectives of this program are to contribute to understanding of the ozone hole problem and to characterize the radiative properties of clouds by means of lidar, IR radiometry, local meteorological data and satellite data, in order to better understand the role of clouds in the radiative budget of the

planet. A complex DIAL system, to carry out ozone concentration measurements in the ozone hole, is presently being built under the Italian-French cooperative program for Antarctica, while an automated Nd-YAG diode pumped lidar is being designed to operate semiautomatically in an antarctic winter base, possibly at Dome C, which will be located on the Antarctic Plateau at 3250 m altitude.

I-47507

Browell, E.V., **Differential absorption lidar detection of ozone in the troposphere and lower stratosphere**, Optoelectronics for environmental sciences, edited by S. Martellucci and A.N. Chester, New York, Plenum Press, 1991, p.77-89, Proceedings of the 14th Course of International School of Quantum Electronics. 21 refs.

The DIAL technique for deriving ozone profiles from lidar measurements is discussed. The NASA airborne DIAL system is described as an example of an advanced field system, and results are presented for studies of: a) photochemically produced ozone in the summertime over the eastern United States and in biomass burning plumes during the dry season over the Amazon Basin of Brazil; b) vertical ozone transport from the mixed layer into the free troposphere via cloud dynamics and from the stratosphere into the troposphere via tropopause fold events; and, c) ozone depletion in the ozone hole over Antarctica. The airborne DIAL measurements discussed in this paper demonstrate the advanced capability of lidar for conducting ozone investigations throughout the troposphere and lower stratosphere under widely different atmospheric conditions. (Auth.)

I-47510

Worsnop, D.R., Fox, L.E., Zahniser, M.S., Wofsy, S.C., **Vapor pressures of solid hydrates of nitric acid: implications for polar stratospheric clouds**, *Science*, Jan. 1, 1993 259(5091), p.71-74, Numerous refs.

Thermodynamic data are presented for hydrates of nitric acid: $\text{HNO}_3 - \text{H}_2\text{O}$, $\text{HNO}_3 - 2\text{H}_2\text{O}$, $\text{HNO}_3 - 3\text{H}_2\text{O}$, and a higher hydrate. Laboratory data indicate that nucleation and persistence of metastable $\text{HNO}_3 - 2\text{H}_2\text{O}$ may be favored in polar stratospheric clouds over the slightly more stable $\text{HNO}_3 - 3\text{H}_2\text{O}$. Atmospheric observations indicate that some polar stratospheric clouds may be composed of $\text{HNO}_3 - 2\text{H}_2\text{O}$ and $\text{HNO}_3 - 3\text{H}_2\text{O}$. Vapor transfer from $\text{HNO}_3 - 2\text{H}_2\text{O}$ to $\text{HNO}_3 - 3\text{H}_2\text{O}$ cloud may be a key step in the sedimentation of HNO_3 , which plays an important role in the depletion of polar ozone. The mechanism proposed here would help explain observed denitrification in both polar regions, and may contribute to the associated north-south asymmetry in the severity of O3 loss. (Auth.)

I-47575

Granier, C., Brasseur, G., **Impact of heterogeneous chemistry on model predictions of ozone changes**, *Journal of geophysical research*, Nov. 20, 1992 97(D16), p.18,015-18,033, Refs. p.18,031-18,033.

A two-dimensional chemical/transport model of the middle atmosphere is used to assess the importance of chemical heterogeneous processes both in the polar regions on polar stratospheric clouds (PSCs), and at other latitudes on sulfate aerosols. When conversion on type I and type II PSCs of N_2O_5 into HNO_3 and of ClONO_2 into reactive forms of chlorine is taken into account, enhanced ClO concentrations lead to the formation of a springtime "ozone hole" over the antarctic continent. No such major reduction in the ozone column is found in the arctic region. When conversion of nitrogen and chlorine compounds is assumed to occur on sulfate particles present in the lower stratosphere at all latitudes, significant perturbations in the chemistry are also found. For background aerosol conditions, the concentration of nitric acid is enhanced and agrees with observed values, while that of nitrogen oxides is reduced and agrees less than

if heterogeneous processes are ignored in the model calculations. The concentration of the OH radical is significantly increased. Ozone number density appears to become larger between 16 and 30 km but smaller below 16 km, especially at high latitudes. (Auth. mod.)

I-47578

Crutzen, P.J., Müller, R., Brühl, C., Peter, T., **On the potential importance of the gas phase reaction $\text{CH}_3\text{O}_2 + \text{ClO} \rightarrow \text{ClOO} + \text{CH}_3\text{O}$ and the heterogeneous reaction $\text{HOCl} + \text{HCl} \rightarrow \text{H}_2\text{O} + \text{Cl}_2$ in "ozone hole" chemistry**, *Geophysical research letters*, June 2, 1992 19(11), p.1113-1116, 28 refs.

Attention is called to the great importance of the gas phase reaction $\text{ClO} + \text{CH}_3\text{O}_2 \rightarrow \text{ClOO} + \text{CH}_3\text{O}$ and the heterogeneous reaction $\text{HCl} + \text{HOCl} \rightarrow \text{Cl}_2 + \text{H}_2\text{O}$ on polar stratospheric cloud (PSC) particles. These reactions may accomplish the almost complete conversion of HCl into ClOx radicals, thus leading to rapid destruction of ozone. (Auth.)

I-47580

Nam, J.C., Lee, B.Y., **Study on the meteorological characteristics over King Sejong Station, Antarctica during 1990**, *Journal of atmospheric research*, 1991 8(1), p.63-70, In Korean with English summary. 4 refs.

Meteorological data collected at King Sejong Station during 1990 are analyzed to determine the meteorological characteristics over the region. The surface pressure, temperature, relative humidity, wind speed and cloud amount averages, and total snow accumulation, were 986.7 mb, -1.9 C, 93%, 7.8 m/s, 6.1 octas and 850.4 cm, respectively. Twenty-two blizzards were observed; the total duration time was 296 hrs. between Jan. and Oct. According to data, the weather in winter was severe because of blizzards with heavy snowfalls and strong winds, but it was comparatively mild in the summer. The weather during fall and spring was very variable. This kind of weather was due to the frequent occurrence of low pressure systems and the topographical blocking effects of the Antarctic Peninsula on the station. (Auth. mod.)

I-47584

Beliazo, V.A., Ul'ianov, V.P., **Atmospheric circulation of the Southern Hemisphere and geomagnetic activity** [Atmosferaia tsirkuliatsiia iuzhnogo polushariia i geomagnitnaia aktivnost'], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.14-17, In Russian. 4 refs.

The link between meteorological parameters and geomagnetic activity is discussed. From analysis of data on atmospheric processes in the Southern Hemisphere, obtained from long-term daily weather forecast records begun in 1965, the occurrence of 3 different circulation forms is established: one zonal, Z, and 2 meridional, Ma and Mb. Each of these processes is described in the light of calculations showing their link with lunar synodic-cycle phases. It is proposed that the rotation of the Moon in its orbit influences Earth's geomagnetic activity and, through it, the atmospheric circulation.

I-47585

Mart'ianov, V.L., **Atmospheric radiation regime at Russkaya Station** [Osobennosti radiatsionnogo rezhima atmosfery raiona stantsii Russkaya], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.17-22, In Russian.

The properties of the solar radiation regime at Russkaya Station are summarized as follows: the decrease of total solar radiation between Mar. and Nov. results in greater cyclonic activity in the northeastern portion of the Ross Sea; the occurrence of severe snow-

storms at the station further decreases solar radiation by 60-75%, and decreases surface albedo. A table showing monthly values for temperature, cloudiness, wind speed, snowfall (number of days), percent of surface albedo, the length (%) of solar radiation, and radiation balance components at Russkaya Station from Mar. 1983 to Feb. 1984 is presented.

I-47586

Safronov, V.A., **Procedure for collecting, processing and transmitting aerometeorological information from antarctic stations and research vessels** [Tekhnologiya sbora, obrabotki i peredachi aerometeorologicheskoi informatsii s antarkticheskikh stantsii i nauchno-issledovatel'skikh sudov], *Sovetskaia antarkticheskaya ekspeditsiia. Informatsionnyiulleten'*, 1991 No.115, p.22-26, In Russian. 4 refs.

Discussion of experimental transmission of aerologic information between Bellingshausen Station and the R/V *Professor Zubov* through satellite channels, carried out during SAE-32, a qualitative evaluation of radio channels, and the quantitative estimate (%) of delays between Molodezhnaya Station and Moscow, and Molodezhnaya and other antarctic stations, are presented. A program for improved collection, processing and transmission of meteorologic and aerologic information in Antarctica is proposed, and a flow-chart is presented.

I-47597

Tsigel'nitskii, I.I., **Automatic meteorological stations in the Antarctic** [Avtomaticheskie meteorologicheskie stantsii v Antarktike], *Sovetskaia antarkticheskaya ekspeditsiia. Informatsionnyiulleten'*, 1991 No.115, p.63-65, In Russian.

A review is presented of the "Antarctic automatic weather station data for the calendar year 1987", published by the University of Wisconsin in Sep. 1988. A table is included showing the name, coordinates, altitude, identification number, the type of weather observations, and the installation date (from Jan. 8, 1980 to Dec. 1, 1987) of the 28 stations listed.

I-47598

IUrganov, L.N., Sveshnikov, A.M., Kondratiuk, A.I., Blum, E.M., **Total atmospheric ozone measurements in Antarctica, 1988-1989** [Predvaritel'nye rezul'taty izmerenii obshchego soderzhaniia atmosfernogo ozona v Antarktide v 1988 i 1989 gg], *Sovetskaia antarkticheskaya ekspeditsiia. Informatsionnyiulleten'*, 1991 No.115, p.66-69, In Russian.

Tables showing 1988 and 1989 daily ozone averages in Dobson units for Aug.-Dec. at Mirnyy, Sep.-Dec. at Vostok, and Sep.-Dec. at Novolazarevskaya stations are presented, as are those obtained in 1989 from the ships *Polarstern* and *Akademik Fedorov* for Sep.-Oct. and Sep.-Nov., respectively, at various latitudes and longitudes and in different weather conditions.

I-47600

By radio from Antarctica [Po radio iz Antarktiki], *Sovetskaia antarkticheskaya ekspeditsiia. Informatsionnyiulleten'*, 1991 No.115, p.78-79, In Russian.

A month-to-month table is presented on meteorological data, including atmospheric pressure and temperature, wind speed, relative humidity, cloudiness and mean height reached by radiosondes, recorded at each of the 8 Soviet stations from July through Dec., 1989.

I-47609

Ramaswamy, R., Schwarzkopf, M.D., Shine, K.P., **Radiative forcing of climate from halocarbon-induced global stratospheric ozone loss**, *Nature*, Feb. 27, 1992 355(6303), p.810-812, 27 refs.

Observations from satellite and ground-based instruments indicate that between 1979 and 1990 there have been statistically significant losses of ozone in the lower stratosphere of the middle to high latitudes in both hemispheres. Here the authors determine the radiative forcing of the surface-troposphere system due to the observed decadal ozone losses, and compare it with that due to the increased concentrations of the other main radiatively active gases (CO₂, CH₄, N₂O and chlorofluorocarbons) over the same time period. The results indicate that a significant negative radiative forcing results from ozone losses in middle to high latitudes, in contrast to the positive forcing at all latitudes caused by the CFCs and other gases. As the anthropogenic emissions of CFCs and other halocarbons are thought to be largely responsible for the observed ozone depletions, the results suggest that the net decadal contribution of CFCs to the greenhouse climate forcing is substantially less than previously estimated. (Auth.)

I-47610

Keys, J.G., Johnston, P.V., Blatherwick, R.D., Murcray, F.J., **Evidence for heterogeneous reactions in the antarctic autumn stratosphere**, *Nature*, Jan. 7, 1993 361(6407), p.49-51, 24 refs.

Measurements are presented of antarctic stratospheric NO₂ and HNO₃ concentrations taken in 1991. The results demonstrate that reactive nitrogen was converted to HNO₃ in autumn, before temperatures were low enough for polar stratospheric clouds to form. It is concluded that heterogeneous chemistry on background aerosols was responsible for this conversion, which brought with it the potential for additional ozone loss in the autumn. (Auth. mod.)

I-47653

Karnatsevich, I.V., **Energy resource of winter season in Siberia and polar areas**, International Conference on Cryopedology, 1st, Pushchino, Nov. 10-16, 1992. Proceedings. Edited by D.A. Gilichinskiĭ, Pushchino, Pushchino Research Centre, 1992, p.177-179, 1 ref.

A new method of analyzing the radiation function is presented. All land is divided into warm and cold areas. In cold areas the year is divided into 2 radiation seasons depending on the presence or absence of short wave radiation. Investigation of heat balance data from the 2 polar regions (including Vostok and Mirnyy stations) shows that there are stable heat and water structures during both radiation seasons. (Auth. mod.)

I-47655

Kotliakov, V.M., Lorius, K., **Global changes during the latest glacial-interglacial cycle**, *Polar geography and geology*, Apr.-June 1992 16(2), p.89-113, Translated from *Izvestiia Rossiiskoy Akademii nauk. Seriya geograficheskaya*, 1992, No.1. Refs. p.110-113.

This review article summarizes the results of Soviet-French investigations into the ice core from a deep drillhole at Vostok Station. Changes in air temperature, snow accumulation, greenhouse gases, aerosols and other chemical components in the environment are traced over 160,000 years, i.e., over a full climatic cycle. Orbital and atmospheric impacts on the climate and on the role of greenhouse gases in these processes are analyzed. On the basis of these analyses, it is predicted that with a doubling of atmospheric CO₂, temperatures may rise by 3-4 C. This in turn could lead to a massive collapse of the world's marine ice sheets and to a sea-level rise of 5-7 m; mountain

glaciers in temperate and subtropical latitudes would almost entirely disappear. (Auth. mod.)

I-47659

Abbatt, J.P.D., Molina, M.J., **Heterogeneous interactions of ClONO₂ and HCl on nitric acid trihydrate at 202 K**, *Journal of physical chemistry*, Sep. 17, 1992 96(19), p.7674-7679, 23 refs.

Using a low-pressure flow tube coupled to a mass spectrometer, reaction probabilities (gammas) for ClONO₂+H₂O - HOCl+HNO₃ (1) and ClONO₂+HCl - Cl₂+HNO₃ (2) have been measured on nitric acid trihydrate (NAT) films at 202 K for reactant partial pressures in the .000001 Torr range. When the water vapor pressure over the NAT film approaches that of ice, gamma 1 = 0.002 and gamma 2 > 0.2. For lower water partial pressures, characteristic of HNO₃-rich NAT, the gammas decrease by 2 orders of magnitude. For HCl partial pressures of .000005 Torr, the experiments indicate that H₂O-rich NAT films take up HCl in amounts similar to those taken up by water-ice surfaces; HNO₃-rich NAT films take up to orders of magnitude less HCl. At high HCl partial pressures much greater uptake by both H₂O-rich and HNO₃-rich films is observed, indicating that the NAT films melt under these conditions. This experiment simulates the chemical reactions judged responsible for the depletion of atmospheric ozone over Antarctica. (Auth. mod.)

I-47679

Italy. Programma Nazionale di Ricerche in Antartide, **Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1** [Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1], Rome, ENEA, [1991], 634p., Refs. passim. For selected papers see I-47680 through I-47692 or 47-1822 through 47-1827.

This is the first of two volumes of a collection of papers dealing with physics of the atmosphere and cosmophysics in Antarctica; some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Program, and have been published in national and international journals. The aim of the collection is to simplify access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. (Auth. mod.)

I-47680

Anav, A., Di Menno, I., Guerrini, A., Schiano, M.E., **Atmospheric turbidity in Antarctica** [Misure di torbidità atmosferica in Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.7-25, In Italian. Reprinted from IFA-CNR, Technical report 86/33, 1986. 24 refs.

Results are presented of a series of atmospheric turbidity measurements carried out in Terra Nova Bay during the Italian Antarctic Expedition in Jan. 1986. Analysis of data shows consistently low turbidity values and the prevailing presence of small particles in the atmosphere of the area. Average monthly and annual values, and their hourly distribution, are presented in tables.

I-47681

Stefanutti, L., **Lidar measurements of antarctic atmospheric parameters** [Misure lidar di parametri atmosferici in Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.27-41, In Italian. Reprinted from IROE-CNR, Internal report, Dec. 1986. 10 refs.

The great advantages of the use of lidar in obtaining vertical profiles of various atmospheric parameters in remote areas are discussed. The characteristics of the elastic backscatter lidar and the differential absorption lidar are described, and the installation of these systems at year-round stations in Antarctica, such as McMurdo or Amundsen-Scott, is recommended.

I-47682

Castagnoli, F., **Elastic backscattering lidar system for atmospheric measurements** [Criteri per il progetto di un sistema lidar a backscattering elastico per misure atmosferiche in Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.43-94, In Italian. Reprinted from IROE-CNR, Internal report, Feb. 1987.

A step-by-step description is given of the materials and equipment needed for an effective installation of an elastic backscattering lidar system for atmospheric measurements in Antarctica. Consideration is given to problems deriving from unfavorable climatic conditions, with precise instructions as to how to overcome them. The general dimensions of the system are provided, and the operation of all parts is described in detail; the corresponding plans and recorded data are presented in charts and tables.

I-47683

Visconti, G., **Ozone hole over Antarctica** [Il buco di ozono sull'Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.102-117, In Italian. Reprinted from Il Nuovo saggatore, 1987, 5(3), p.34-49.

A review is presented of the dynamics of ozone depletion in Antarctica, including a discussion on residual circulation, ozone chemistry, radiation, and the different theories on the formation of the ozone hole.

I-47684

Fiocco, G., Fua, D., **South Pole lidar: brief description of the instrument**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.127-143, Reprinted from Università di Roma "La Sapienza", Internal note No.907, 1988.

The lidar system installed in the clean air facility at Amundsen-Scott Station is described. The lidar uses a Nd-YAG laser with 2nd harmonic generation, a 50 cm diameter telescope, and two-channel detection. Data are sent via ATS-3 and the electronic mail network to the University of Rome for further analysis. The project is a collaboration between the University of Rome and NOAA Geophysical Monitoring for Climate Change. (Auth.)

I-47685

Guerrini, A., **Atmospheric microphysical measurements in Terra Nova Bay** [Misure di microfisica dell'atmosfera presso la baia de Terra Nova in Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.145-154, In Italian with English summary. Reprinted from *Acqua-Aria*, 1988, 4, p.453-461. 23 refs.

Preliminary results of meteorological investigations carried out at Terra Nova Bay during the Italian Antarctic Expedition of 1986-1987 are presented. Data charts include atmospheric turbidity measurements, ground ozone concentrations, and temperature and wind measurements. Analysis of data reveals a high temperature gradient (1-1.5°C) between 3 and 6 m levels. A description is given of the instruments used, some of which were installed during the previous expedition.

I-47686

Stefanutti, L., **Ozone hole** [Il buco dell'ozono], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.159-164, In Italian. Reprinted from *Atti della Fondazione Giorgio Ronchi*, Nov.-Dec. 1988, 43(6). 12 refs.

The dynamics of the ozone hole are described, and various chemical processes occurring in the antarctic stratosphere are reviewed, with particular regard to chlorine catalytic cycles and the role of polar stratospheric clouds in the antarctic heterogeneous chemistry. Stratospheric chlorine sources, found to be the primary cause of the ozone hole, are attributed to CFC emissions produced by man.

I-47687

Argentini, S., Ocone, R., Mastrantonio, G., Fiocco, G., **Statistical analysis of katabatic winds near Terra Nova Bay Station, 1987-1988** [Analisi statistica dei venti catabatici nelle vicinanze della Base di Terra Nova Bay, Antartide, durante la campagna '87-'88], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.173-255, In Italian with English summary. Reprinted from *IFA-CNR*, Internal report 89/27, 1989. 6 refs.

Katabatic winds constitute one of the main features of the antarctic circulation. They originate on the antarctic plateau and reach extremely high velocity in their descent towards the low level coastal areas. The katabatic winds, a boundary layer phenomenon, are only

weakly coupled to the air flow above, and display a high degree of persistence. They are determined mainly by the surface temperature inversion and by the terrain slope. In the summer of 1987-88 a three-axis sodar was installed at the Italian Terra Nova Bay Station and was operated for a total of approximately 40 days. In the present work statistics of winds and mean wind profiles for katabatic winds are presented. (Auth.)

I-47688

Cacciani, M., Di Sarra, A., Fiocco, G., Amoruso, A., **Absolute determination of the cross sections of ozone in the wavelength region 339-355 nm at temperatures 220-293 K**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.259-264, Reprinted from *Journal of geophysical research*, June 20, 1989, 94(D6), p.8485-8490. 14 refs. .

Absolute measurements of the ozone absorption coefficient in the Huggins bands at different temperatures have been carried out. Ozone is produced by an electrical discharge and stored cryogenically: differential absorption measurements are subsequently obtained in a slowly evolving mixture of ozone and molecular oxygen. High resolution (to 0.12 nm) measurements cover a spectral range (339-355 nm) where the ozone absorption shows a strong dependence on temperature. Results at 293 and 220 K are reported; they are particularly interesting in view of the utilization of this spectral region as a low-absorption reference channel for the observation of atmospheric ozone profiles by active probing techniques. Coherent radiation at two wavelengths, around 355 and 353 nm, respectively, can be obtained as the third harmonic of the fundamental output of a Nd:YAG laser and by H₂ Raman shifting of an XeCl excimer laser output. (Auth.)

I-47689

Gasparotto, G., **Preliminary investigation on eolian particulate from western Terra Nova Bay, Antarctica**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.271-283, Reprinted from *Bollettino di oceanologia teorica ed applicata*, Jan.-Apr. 1989, 7(1-2), p.139-150. 56 refs.

Wind-blown materials collected by mesh panels in the lower atmosphere at Terra Nova Bay have been investigated. Roughly estimated dust-loadings range from 11 to 139 ng/cu m, i.e. three orders of magnitude lower than in samples collected at mid-latitude. Present data are much higher than those reported in the antarctic literature. Grain-size, mineralogy and elemental analysis reveal the important contribution of "giant" particles of local source (from the surrounding outcrops, moraines and beach deposits). In addition, variable amounts of clay minerals, whose sedimentological significance is under study, were detected. Numerous spherical particles of probable cosmic origin and several biogenic fragments (diatoms) have been recognized. (Auth.)

I-47690

Mastrantonio, G., **Sodar observations of the antarctic boundary layer, 1986-1987** [Osservazioni sodar dello strato limite antartico durante la campagna 1986-1987], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.285-348, In Italian with English summary. Reprinted from IFA-CNR, Technical report 89/6, Feb. 1989. 12 refs.

Data on the atmospheric boundary layer, recorded by a single axis sodar system during the 1986-1987 Italian Antarctic Expedition to Terra Nova Bay, are analyzed. The results are discussed and presented in tables and charts; physical and theoretical features of the sodar system used are described.

I-47691

Mastrantonio, G., Ocone, R., Argentini, S., Fiocco, G., **Sodar data obtained with a three-axis Doppler system at Terra Nova Bay in 1987-1988** [Dati sodar raccolti durante la campagna antartica 1987-88 a Terra Nova Bay con un sistema Doppler a tre assi], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.349-584, In Italian with English summary. Reprinted from IFA-CNR, Internal report 89/26, 1989. 7 refs.

During the summer season of the Italian Antarctic Expedition of 1987-1988, a 3-axis sodar system was installed at the Terra Nova Bay Station. The total period of operation was approximately 40 days, and the data recorded, including vertical and horizontal wind profiles, are presented in tables and charts. Documentation being the aim of this report, no data analysis is offered; instead, 226 pages of recorded data are included. (Auth. mod.)

I-47692

Stefanutti, L., **Lidar in Antarctica**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.1. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1), Rome, ENEA, [1991], p.623-629, Reprinted from Società Italiana di Fisica, 1989, 21, p.297-302. 12 refs.

A review of the ozone hole issue is presented, and the dynamics of its formation are described. The advantages of the lidar technique in Antarctica for the investigation of polar atmosphere, with particular interest in climatological problems and in the ozone hole phenomenon, are discussed. The 1987-1988 lidar activities at Terra Nova Bay Station are outlined.

I-47710

Ejiri, M., **Polar patrol balloon experiment in Antarctica**, *Advances in space research*, Feb. 1993 13(2), p.(2)127-130, 5 refs.

Since 1984 the National Institute of Polar Research, the Institute of Space and Astronautical Science and collaborative scientists have searched for feasibility of the long-term circumpolar balloon experiment called the Polar Patrol Balloon (PPB) project. This project aims

at establishing a station network in the stratosphere over the antarctic region for geophysical and astrophysical observations. Three test flights in 1987 and 1990 at Showa Station have shown that a PPB would come back to the launching site with a good probability. During 1991-1993 the PPB experiments will consequently be made for scientific researches at Showa Station. This paper reports unique advantages of this experiment and briefly reviews the past PPB experiments. (Auth.)

I-47711

Eckman, R.S., **Some aspects of the interaction between chemical and dynamic processes relating to the antarctic ozone hole**, *Advances in space research*, Jan. 1993 13(1), p.(1)311-(1)319, 28 refs.

Observational and modeling studies have been conducted to examine the interaction between the chemical and dynamical processes that occur during springtime in the lower stratosphere of the Southern Hemisphere. The temporal evolution of the ozone distribution and the circulation during 1987 is contrasted with that for 1988 as an illustrative example of how dynamical processes and the resulting meteorological conditions modulate the ozone depletion. Concurrently with the observational analysis, an effort was initiated to simulate the ozone depletion during austral spring using a three-dimensional chemical/transport model. The model includes a parameterized representation of the heterogeneous processes thought to be important in this region. The simulation indicates that the inclusion of this additional chemistry, which results in the release of free chlorine and the redistribution of odd nitrogen into reservoir species, reproduces many aspects of the observations. While significant uncertainties and difficulties remain in order to include heterogeneous chemistry in stratospheric models in a self-consistent manner, the preliminary results are encouraging and provide an impetus for improving current models. (Auth.)

I-47721

Reifenhäuser, W., Heumann, K.G., **Determinations of methyl iodide in the antarctic atmosphere and the south polar sea**, *Atmospheric environment*, Nov. 1992 26A(16), p.2905-2912, 27 refs.

Methyl iodide (CH₃I) concentrations were determined in the atmosphere and in surface sea water near the Antarctic Peninsula with a gas chromatographic/electron capture detector system during Oct.-Dec. 1987. The mean air concentration of methyl iodide was 2.4 pptv with a corresponding seawater concentration of 2.6 ng/l. In addition, chloriodomethane (CH₂ClI) was detected in some of the seawater samples as a second volatile organoiodine species. No relationship between methyl iodide and biogenic brominated methanes was found. From this it follows that methyl iodide has a different pathway of biogenic production in marine organisms than the brominated methanes. Based on a two-phase model, a global sea-to-air flux for methyl iodide of 80 billion g/yr was calculated. This is important for the balance of the global biogeochemical iodine cycle, assuming that methyl iodide is by far the dominant volatile organoiodine species in the environment. (Auth. mod.)

I-47722

Chýlek, P., Johnson, B., Wu, H., **Black carbon concentration in Byrd Station ice core: from 13,000 to 700 years before present**, *Annales geophysicae*, Aug. 1992 10(8), p.625-629, 28 refs.

In this paper, data concerning the concentration of black carbon in 22 ice core samples from Byrd Station (West Antarctica) covering the time period from about 13,000 to 700 years before present are presented. For the first time, black carbon concentrations were obtained in an ice core which included a part of the last climatic transition. An average black carbon concentration of 0.1 microgram/kg

was found to pertain to the Wisconsin-Holocene climatic transition. After the transition the black carbon concentration in the ice core oscillated between 0.1 and 0.95 microgram/kg, with an average concentration of 0.5 microgram/kg. The increase in black carbon concentration occurred several hundred years after changes in $\delta^{18}O$, CO_2 and CH_4 characterizing the end of the last (Wisconsin) ice age. It is suggested that expansion of the land biomass during the early Holocene was responsible for the observed increase of black carbon concentration in the Byrd Station ice core. (Auth. mod.)

I-47725

Italy. Programma Nazionale di Ricerche in Antartide, **Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2** [Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2], Rome, ENEA, [1991], 495p., Refs. passim. For selected papers see I-47728 through I-47730, K-47726 and K-47727.

This is the second of two volumes of a collection of papers dealing with physics of the atmosphere and cosmophysics in Antarctica; some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Program, and have been published in national and international journals. The aim of the collection is to simplify access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. (Auth. mod.)

I-47728

Fiocco, G., Mastrantonio, G., Ocone, R., Argentini, S., **Acoustic sounder experimentation in Victoria Land, Antarctica, Italy.** Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.119-133, Reprinted from proceedings of the 5th International Symposium on Acoustic Remote Sensing, New Delhi (India), Feb. 6-9, 1990, 15p. 8 refs.

In the 1987-88 summer a 3 axis sodar with 1.2 m diameter antennas was installed at Terra Nova Bay for a duration of approximately 40 days. During the 1988-89 campaign, the sodar was deployed on the Nansen Ice Sheet and ran uninterruptedly for about 40 days. All systems deployed had a Doppler capability. There are significant differences between the measurements carried out at the two locations. The main features observed at Terra Nova Bay were the frequent presence of strong convection and episodes of sustained subsidence. The convective activity, with sometimes large values of vertical velocity, is related to the extensive deglaciation and to the large amounts of heat absorbed at the ground. Starting with the second campaign, a complete and continuous description of the three-dimensional wind field was obtained; several katabatic wind episodes have been recorded. Strong signals associated with large negative values of the vertical velocities were occasionally observed during snowstorms and attributed to precipitating graupel. (Auth. mod.)

I-47729

Mastrantonio, G., Ocone, R., Pellegrini, A., Fiocco, G., **Sodar observations of the antarctic boundary layer in a deglaciated area: preliminary results, Italy.** Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.467-475, Reprinted from Il Nuovo cimento, May-June 1990, 13C(3), p.589-597. 5 refs.

A single-axis sodar system with off-line Doppler analysis was in operation in Jan. 1987 at the Italian Terra Nova Bay Station. The instrument was installed in complex terrain at a distance of approximately 1 km from the shore. The area around the station was completely deglaciated and exposed to periods of direct solar irradiation. Measurements were carried out almost continuously with the antenna pointing to the zenith or at zenith angles of 20 and 30 deg in the NE direction. From a preliminary analysis of the data, the main phenomena observed were as follows: very intense convection during periods of insolation, with vertical velocities up to 4 m/s; evidence of layering and Kelvin-Helmholtz instabilities; and strong subsidence. (Auth.)

I-47730

Giovanelli, G., **Measurements of climatic parameters and ground-level ozone at Terra Nova Bay in Antarctica, Italy.** Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.483-495, Reprinted from Il Nuovo cimento, Jan.-Feb. 1991, 14C(1), p.1-13. 14 refs.

The results of local meteorology, solar radiation and ground-level ozone measurements taken in Dec. '86-Feb. '87 at Terra Nova Bay are presented. The site of the Italian base camp is characterized by a thin strip of deglaciated ground, along which the temperature measurements close to the ground and up to 6 m high show a strongly superadiabatic profile. This irregular trend of the temperature in the surface layer is mainly due to the high incoming levels of radiation and to the extreme transparency of the atmosphere. This is also shown by the low values of the ratio between total radiation and diffuse radiation. The ground is thus subjected to intense heating, especially in the warmer hours of the day, while the surface layer of the atmosphere is characterized by strong upward heat fluxes and by turbulent convective movements. Vertical temperature profile measurements show an almost forced persistence in the superadiabatic trend, which tends towards isothermic values only as a result of rapid variations in the direction and intensity of the wind, connected to the downward flux of cold air masses, shown also by the simultaneous increases in ground-level ozone concentrations. (Auth. mod.)

I-47732

Gobbi, G.P., Deshler, T., Adriani, A., Hofmann, D.J., **Evidence for denitrification in the 1990 antarctic spring stratosphere: 1. Lidar and temperature measurements, Geophysical research letters, Nov. 1991 18(11), p.1995-1998, 17 refs.**

Lidar soundings of the lower stratosphere were made between Aug. 30 and Oct. 11, 1990, at McMurdo Station. Polar stratospheric clouds (PSCs) were observed in only two periods: between Sep. 5 and 10, and on Oct. 7. During these days McMurdo was well within the polar vortex, and temperatures in the lower stratosphere reached seasonal minima. Temperature soundings and two water vapor meas-

urements were also made in the same period. The water vapor content between 11 and 20 km was found to be between 2 and 3 ppmv. Using these values for water vapor, condensation temperatures for water and nitric acid trihydrate were calculated and compared with the temperature measurements. Analysis of these comparisons, together with the lidar observations, indicated that PSCs appeared only when temperatures were below the threshold condensation point for an air mass containing approximately 1 ppbv nitric acid. This was observed from the beginning of measurements on Aug. 30, and suggests that the antarctic lower stratosphere was highly denitrified both at the end of winter and during the early spring of 1990. (Auth.)

I-47738

McKendry, I.G., Lewthwaite, E.W.D., **Summertime along-valley wind variations in the Wright Valley, Antarctica**, *International journal of climatology*, Sep.-Oct. 1992 12(6), p.587-596, 17 refs.

Observations from several sites are used to investigate spatial and temporal variations in the local wind regime of the Wright Valley in Antarctica. Approximately one-quarter of the time this tongue is pushed down-valley beyond the western edge of Lake Vanda by westerly downslope winds. These winds seldom penetrate to the mouth of the valley, and instead a 'front' is formed between the up-valley and down-valley flows. Migration of the front appears to be related to synoptic controls rather than local thermal forcing. Support is provided for the view that the westerlies are episodic downslope winds associated with the deflection of strong upper level flow into the valley system. Superimposed on this broad pattern are diurnal variations in the strength of valley winds associated with changing stability. (Auth. mod.)

I-47744

König-Langlo, G., **Meteorological data of the Georg-von-Neumayer-Station (Antarctica) for 1988, 1989, 1990 and 1991**, *Berichte zur Polarforschung*, 1992 No.116, 70p., 8 refs.

All routine meteorological observations from the Georg von Neumayer Station are archived in the Meteorological Information System at the Alfred Wegener Institute (MISAWI). This information system provides quick and easy access to all archived data as well as to extensive background information. Data subsets, statistics or derived quantities can be retrieved with a small effort. Thus, AWI is now able to provide such data on request. This report presents only a short description of the MISAWI and a brief overview of the meteorological conditions during the years 1988 through 1991. It does not cover special data analysis, but does offer all necessary information to any reader wishing to order data for individual data analysis.

I-47749

Litfin, K.T., **Power and knowledge in international environmental politics: the case of stratospheric ozone depletion**, Los Angeles, University of California, 1992, 474p., University Microfilms order No. 92-13646, Ph.D. thesis. Refs. p.440-474.

The availability of scientific knowledge to the relevant decision makers was a necessary condition for the negotiation of the Montreal Protocol on Substances that Deplete the Ozone Layer, but it was far from being a sufficient one. The power of science was a function of the political context in which it was debated, a context which was defined substantially by the discovery of the antarctic ozone hole. The prominence of knowledge-based power in at least some situations means that conventional materialist notions of power should be expanded to include a more discursive and productive conception of power. Environmental problems are not merely physical events, but informational phenomena. A case study methodology is used to develop an interactive conception of power and knowledge. A detailed

study of the Montreal Protocol is offered, as well as less detailed studies of the international policy processes for acid rain and global climate change. (Auth. mod.)

I-47775

Liu, X., Blatherwick, R.D., Murcray, F.J., Keys, J.G., Solomon, S., **Measurements and model calculations of HCl column amounts and related parameters over McMurdo during the austral spring in 1989**, *Journal of geophysical research*, Dec. 20, 1992 97(D18), p.20,795-20,804, 47 refs.

Solar spectra obtained from a ground-based Fourier transform infrared instrument at McMurdo in the spring of 1989 have been analyzed to determine total HCl column amounts. A one-dimensional photochemical model was used to simulate the rate of recovery of HCl in the springtime. Low column amounts were observed in early Sept. and may be attributed to the heterogeneous conversion of HCl to active chlorine species during the polar night. The rate of recovery of HCl is consistent with its production by chlorine atoms reacting with methane and is dependent on concentrations of active chlorine species and NO molecules in the altitude region from 12 to 22 km. High HCl column amounts were observed following recovery in late Oct., suggesting that the lower stratosphere in the polar region had descended relative to mid-latitudes and that the degree of de-chlorination of the transported air was very small. (Auth. mod.)

I-47776

Akiyoshi, H., Uryu, M., **Diagnostic model study of the seasonal variation of global ozone and the antarctic ozone hole**, *Journal of geophysical research*, Dec. 20, 1992 97(D18), p.20,837-20,853, 46 refs.

A simple two-dimensional model is constructed to simulate and gain an understanding of the global distribution of ozone and its seasonal variation. The time dependence of the diffusion coefficients is neglected, except in the polar regions. The effects of the meridional circulation, consisting of the following three components, are taken into account: (1) an annually varying component due to the annual variation in the heating of ozone, oxygen, and water vapor, which is assumed to be anti-symmetric (symmetric with a 6 month shift) about the equator; (2) a nonseasonal, steady component of the transport circulation with ascending air in the tropics and descending air in the middle and high latitudes of both hemispheres; and (3) an annually varying component of the transport circulation which represents planetary wave activity, strong convection in the tropics, and other seasonally variable factors. Although the employed circulations and diffusion coefficients are ad hoc, the simple model simulates the main features of the global distribution of ozone and its seasonal variation. The antarctic ozone hole is discussed from a global point of view. The possibility of a weak Oct. minimum in the antarctic total ozone amount, without introducing chlorine chemistry, is suggested. (Auth. mod.)

I-47785

Colacino, M., ed, Giovanelli, G., ed, Stefanutti, L., ed, **Italian Research on Antarctic Atmosphere, 4th Workshop, Porano, Oct. 21-23, 1991, Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.35**, Bologna, Italian Physical Society, 1992, 540p., Refs. passim. For selected papers see A-47802, F-47796, I-47786 through I-47795, I-47797, I-47799, I-47801, I-47803 through I-47815, K-47798 and K-47800.

This is a collection of papers presented at the 4th Workshop of Italian Research on Antarctic Atmosphere, held Oct. 21-23, 1991, in Porano, Italy. It consists of 30 reports pertinent to Antarctica, divided into 3 sections: 12 papers dealing with the troposphere, planetary boundary layer and meteorology on a local scale; 5 on instrumentation, describing instruments and methods used by Italian working

groups for studies of antarctic atmospheric physics; and 13 dealing with climatology, stratosphere and magnetosphere, with emphasis on ozone depletion.

I-47786

Bodhaine, B.A., **U.S. aerosol monitoring program in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.15-25, 25 refs.

The Climate Monitoring and Diagnostics Laboratory (CMDL) of the National Oceanic and Atmospheric Administration (NOAA), operating an atmospheric monitoring observatory at Amundsen-Scott Station, is reviewed. Long-term measurements of carbon dioxide, ozone, aerosols, and other background pollutants are obtained to understand their possible effects on the earth's climate. The aerosol measurement program consists of the continuous measurement of condensation nucleus concentration and aerosol scattering extinction coefficient. The comments also address the worldwide state of antarctic research and the future recommendations that emerged from the International Symposium on the Tropospheric Chemistry of the Antarctic Region held in Boulder, CO, June 3-6, 1991. (Auth. mod.)

I-47787

Del Guasta, M., **Optical properties of tropospheric clouds as observed in the antarctic base of Dumont d'Urville by means of backscattering lidar**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.27-37, 8 refs.

Data obtained by a 2-channel backscattering lidar system operating in 1989-1990 at Dumont d'Urville Station is under processing in order to obtain physical parameters useful for climate modeling of clouds. Shortwave extinction and backscattering, as well as their ratio, have been computed. A partial statistic of cloud base and top heights is also given. (Auth.)

I-47788

Tomasi, C., Vitale, V., **Mean vertical distribution features of temperature and absolute humidity from the five-year set of radiosounding measurements taken at Terra Nova Bay**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.39-67, 13 refs.

A set of more than 500 radiosound measurements taken at Terra Nova Bay Station from 1987 to 1991 is analyzed and the mean vertical profiles of air pressure, temperature, dew-point and absolute humidity are determined. The data, divided into several diurnal and nocturnal sub-sets of 15-day periods from mid-Nov. to mid-Feb., are presented in figures and tables. Evolutionary trends of the meteorological parameters in the lower stratosphere are clearly evident in both diurnal and nocturnal measurements, although considerable discrepancies are found between the diurnal and nocturnal mean values of both temperature and absolute humidity, especially during the first and the second sub-period. (Auth. mod.)

I-47789

Argentini, S., Mastrantonio, G., **Barrier wind profiles observed in Terra Nova Bay area**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.69-81, 14 refs.

Terra Nova Bay is located on the western part of the Ross Sea, along the Transantarctic Mountains, and because of the strong static stability and the presence of this mountain range, it is subjected to strong barrier winds. An observational study was carried out during summertime in this area using a monostatic Doppler sodar and automatic weather station (AWS) data. Several barrier wind episodes

were recorded: the stability of the atmosphere was recorded on the echo sodar. In most cases the barrier wind profiles have a jet-like shape that seems to become well defined after about 10 hours. Observations show that during summer, inversions may be strong enough to allow the formation of these winds. The data of the AWS stations located around Ross Ice Shelf confirm the sodar observations. (Auth.)

I-47790

Cardillo, F., Moriconi, M.L., Pangia, M., Purini, R., **Three-axial sonic anemometer-thermometer measurements in the Terra Nova Bay: some preliminary results**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.83-96, 9 refs.

The evaluation of the principal parameters determining the evolution of the planetary boundary layer is one of the main tasks in understanding atmospheric and ocean dynamics. In this context, the sonic anemometer-thermometer allows momentum and heat fluxes to be obtained by a direct method, avoiding some of the difficulties inherent in indirect methods. After a short description of the experimental apparatus at Terra Nova Bay, the authors present and discuss some characteristics of both wind components and temperature spectra, this kind of data processing being the preliminary step for the determination of atmospheric boundary layer parameters. (Auth.)

I-47791

Grigioni, P., De Silvestri, L., Pellegrini, A., Sarao, R., **Some climatological aspects in the Terra Nova Bay area, Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.97-121, 6 refs.

A climatological analysis at Terra Nova Bay, based on a 4-year data set obtained in 1987-1990, is presented. Some features, such as the relationship between topography and wind regime, and the winter reversal of the cooling trend of temperature, are investigated. The evidence of the presence of a "coreless winter" at Terra Nova Bay is examined, and a possible mechanism by which it can occur is proposed, based on a driving effect of the katabatic flow. (Auth.)

I-47792

Del Buono, P., Della Vedova, A.M., Fiocco, G., **Analysis of antarctic boundary layer wind regimes in the neighbourhood of Terra Nova Bay**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.123-135, 7 refs.

Analyses of anemological regimes in Victoria Land are presented, with particular reference to katabatic winds, caused by cooling of air on the slopes of the ice-plateau and the movement of this air down the slope under gravity. For this purpose the data collected by different automatic weather station (AWS) and by sodar during Jan. 1989 have been utilized. The AWS are deployed in a region that includes the Reeves N  v  , the Reeves and Priestley Glaciers, Inexpressible I., Tethys Bay and the Nansen Ice Sheet, where the sodar system is located. Two periods (Jan. 8-11, 1989 and Jan. 26-31, 1989) showing an intense and persistent katabatic wind activity are considered in detail. Comparison between the AWS and the sodar results indicates that the orography and the morphology of the terrain may strongly affect the surface data collected by the AWS, and so may not reflect the complexity of the flows. (Auth. mod.)

I-47793

Tirabassi, T., Manco, D., Caiffa, F., **Evaluation of surface turbulent fluxes at Camp Icaro**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.137-150, 14 refs.

The Monin-Obukhov length and relative surface turbulent fluxes have been evaluated using basic meteorological data recorded at Camp Icaro. Two methods recently proposed in the literature were adopted: the Holtslag-van Ulden and the Weil-Brower methods. An attempt was also made at using the profiles method, but the recorded data were not sufficiently accurate for the application of that method. (Auth.)

I-47794

Fantini, M., Buzzi, A., **Influence of air-sea heat exchanges on rapid cyclogenesis in the antarctic region: improved numerical experiments**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.151-165, 8 refs.

The growth of atmospheric disturbances belonging to the family of polar lows is investigated by means of a non-hydrostatic, bidimensional numerical model. The representation of humid thermodynamics has been improved with respect to the previous version of the model. Experiments have been run using a realistic thermodynamic profile in a baroclinically unstable environment. The latent heat release, when air-sea heat exchange is allowed, produces a finite amplitude disturbance which exhibits a rapid growth for about four days. In the absence of heat exchange at the bottom the growth rate is lower and progressively diminishing. The final structure of the disturbance is reminiscent of observed polar lows. (Auth.)

I-47795

Mittner, P., **Multielemental characterization of aerosol at Terra Nova Bay. Preliminary results on the fine component during the 1990-91 austral summer**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.179-189, With Italian summary. 6 refs.

Aerosol sampling was performed at Campo Icaro, in the vicinity of Terra Nova Bay Station in the period between Nov. 1990 and Feb. 1991. The duration of the sampling intervals was approximately 12 hrs and a special aerosol sampler was used, with separation of the coarse and fine components. The authors present aims and methods of the experiment as well as the results of a PIXE analysis of 89 samples of the fine component, collected on Nuclepore filters. Mean values and standard deviations of volume concentrations are given for the following elements: Si, S, Cl, K, Ca, Ti, Mn, Fe, Ni, Cu and Zn. (Auth.)

I-47797

Crescentini, G., Maione, M., Bruner, F., **Halocarbons monitoring at Terra Nova Bay**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.205-213, 11 refs.

Halocarbon concentration levels in the boundary layer atmosphere at Terra Nova bay were monitored during the 1990-91 expedition. Measurements were carried out *in situ* (OASI facilities) by gas chromatographic analysis of 50 ml of air sampled on-line, and in the laboratory by gas chromatography-mass spectrometry analysis of 1-2 l air samples collected at different locations, within a 100 km radius of Terra Nova Bay Station. The data were compared with those obtained during the 1989-90 expedition, showing an increase in halocarbon concentration within the expected values. The existence of strong contamination, probably due to local emission sources, was observed. (Auth. mod.)

I-47799

Bonino, G., Longhetto, A., Trivero, P., **Antarctic RASS: Test in severe weather conditions**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.251-256, 5 refs.

A Radio Acoustic Sounding System (RASS), operating with an acoustic wavelength $\lambda = 1$ m, has been proposed for automatic monitoring of the vertical thermal profile of the antarctic lower troposphere. This system has been designed and built to operate in severe weather conditions. Tests are in progress at the Testa Grigia Station (Plateau Rosa, 3500 m above sea level), in Europe. (Auth.)

I-47801

Gregori, G.P., Martellucci, S., **Underground record of global climate change**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.279-293, 24 refs.

Climatic variations of the last century are recorded by underground temperature profile vs. depth (geotherm) within suitable areas that are not disturbed by water circulation and where heat transport occurs only via conduction and not by advection. Such conditions exist in permafrost areas, provided that the permafrost layer is sufficiently thick. Antarctic permafrost areas are considered to be very well suited for providing perhaps the most direct and reliable record in global climate change investigations. (Auth. mod.)

I-47803

Clarkson, T.S., Nichol, S.E., **1991 ozone hole**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.303-309, 17 refs.

Observations of total ozone from Arrival Heights, near Scott Base, since early 1988 have shown significant depletions of ozone in every spring season. These depletions represent a loss of about half of the ozone column. The season-to-season variations of total ozone and temperatures in the lower stratosphere are discussed here with particular reference to the changing relationships between temperature and ozone amounts. The 1991 ozone depletion event is as severe as in any previous year and its progress up to Nov. 22 is described. (Auth.)

I-47804

Matthews, W.A., Keys, J.G., Solomon, S., **DSIR's stratospheric trace gas programme in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.311-321, 17 refs.

The Department of Scientific and Industrial Research, Physical Sciences Laboratory at Lauder in Central Otago has had an active stratospheric trace gas program in Antarctica since 1982. From that time, an NO₂ spectrometer system has been operated in the zenith looking mode from the New Zealand Laboratory at Arrival Heights. The data gathered from this spectrometer system, particularly in spring and fall, provide an insight into the active photochemistry occurring in the stratosphere at high latitudes. The influence of planetary waves is clearly visible in the data series, and the interchange between the oxide of nitrogen storage reservoirs is discussed. Additional NO₂ and now also O₃ spectrometer systems, built by DSIR but operated jointly, are now also in use at Halley Bay and Showa Station. Simple box model chemical studies, when compared with the observations from both Arrival Heights and Halley Bay, suggest that both the seasonal trend and the diurnal variation in NO₂ is best simulated when reactions on background aerosols are also included in the calculations. (Auth.)

I-47805

Gobbi, G.P., Adriani, A., Ugazio, S., Viterbini, M., **Estimates of denitrification in the 1990 antarctic spring stratosphere**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.323-326, 5 refs.

Twenty-one lidar and temperature soundings were made at McMurdo between Aug. 30 and Oct. 11, 1990. The temperature and lidar soundings were compared to calculated condensation temperatures for NAT, for air containing 2-3 ppmv water and 1-5 ppbv HNO₃. During the measurement period McMurdo was within the polar vortex. Since the observations lasted more than 40 days, and the stratospheric circumpolar transit time at 78S is of the order of 6 days, these soundings explored a representative sample of the antarctic vortex airmass. The 1990 ozone depletion over McMurdo took place between Aug. 28 and Oct. 8. During this period no increase in HNO₃ above the 1 ppbv threshold seems to have taken place, even when the vortex wall was near the station. These observations indicate that the antarctic stratosphere was highly denitrified prior to and during the period of ozone depletion in 1990. (Auth. mod.)

I-47806

Stefanutti, L., **Pinatubo in the Antarctic?**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.327-343.

On July 20, 1991 the POLE lidar located at Dumont d'Urville detected a very strong backscattered signal at heights between 20 and 24 km. The scattering ratio of this signal varied between 300 and 2400 and apparently represented a very strong depolarization. Finding it difficult to attribute this to a polar stratospheric cloud, the authors suggest that such a signal might have been caused by a strong loading of the stratosphere by the Pinatubo eruption. (Auth.)

I-47807

Stefanutti, L., **Preliminary ozone measurements by means of DIAL in Dumont d'Urville**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.345-358, 2 refs.

In 1991, the new ozone lidar began operating at Dumont d'Urville Station in the frame of the Network of Detection of Stratospheric Changes (NDSC). A first partial analysis of the data obtained from Apr. to Oct. 1991 is presented. Due to bad weather conditions, which limited the number of measurements, and only partial data transmission, this analysis has to be considered preliminary. When ozonesonde data were available, a comparison between the lidar and the ozonesonde data was made, showing that the ozone lidar can operate properly in Antarctica. The ozone profiles obtained above 15 km seem generally to be in good agreement with the ozonesonde data. More problematic is the retrieval of data between 10 and 15 km, and only in a few cases have good results been obtained there. (Auth. mod.)

I-47808

Flesia, C., Mugnai, A., Stefanutti, L., **Simulation of lidar depolarization by polar stratospheric clouds**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.359-365, 14 refs.

In this study, the authors analyze the potential of combined lidar backscatter and depolarization measurements of polar stratospheric clouds (PSCs) for deriving information on their microphysical properties. In particular, they use backscattering simulations for nonspherical nitric acid trihydrate (NAT), HNO₃·3H₂O, prolate spheroids in conjunction with PSC lidar observations, to obtain information on the first three moments of the Type I PSC particle size distribution (i.e., particle concentration, mean radius, and standard deviation) and on particle orientation, thus introducing further distinction between Type Ia and Type Ib PSCs. (Auth.)

I-47809

Adriani, A., Di Donfrancesco, G., Gobbi, G.P., **1991 spring lidar campaign for polar stratospheric clouds studies at McMurdo, Antarctica: preliminary results**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.367-373, 5 refs.

Polar stratospheric cloud studies have been in progress since the 1990 spring at McMurdo Station; in the 1991 season, a lidar system was operated for a period of 45 days. Some preliminary results are described in this paper, including comments on the more interesting phenomena observed, along with an overview of the meteorological and the climatic context in which they took place. (Auth.)

I-47810

Pitari, G., Rizi, V., Verdecchia, M., **Formation and growth of PSCs in a 2D model: effects on the secular ozone trend**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.375-396, 15 refs.

A zonally averaged model of the stratosphere is used to assess the role of chemical processes contributing to the ozone trend in the last decade, with the TOMS data for 1980 and 1990 adopted as the observational reference. A satisfactory agreement with the observed trend is found only when chlorine chemistry in polar stratospheric clouds (PSC) is included. It is shown that a correct parameterization of microphysical processes leading to PSC formation is crucial for correctly simulating the heterogeneous polar depletion of ozone, which in turn affects the O₃ global balance through a dynamical dilution of the ozone hole. A zero-dimensional code for PSC microphysics, whose inclusion in the 2D transport model is in progress, is described. (Auth.)

I-47811

Pitari, G., **Antarctic ozone hole and dehydration: feedback on stratospheric temperatures**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.397-416, 23 refs.

A zonally averaged model and a spectral quasi-geostrophic circulation model of the stratosphere have been used to study the possible thermodynamic effects of the secular ozone trend in the antarctic region, coupled with the local dehydration connected to fast sedimentation of water-ice large aerosols (PSC-2). In the 2D model much emphasis is devoted to chemistry. A linear thermodynamic equation for the temperature perturbation due to the ozone hole and dehydration is solved, including the ozone radiative forcing. The same strategy is adopted with the 3D model except for the fact that the full radiative calculation is performed online with the temperature prediction for all scenarios: control run, ozone hole alone and ozone hole coupled with dehydration. It is shown that in all cases the local radiative perturbation by itself is too small to account for the observed springtime temperature decline in the antarctic lower stratosphere during the last decade, pointing to a possible change of the dynamical regime. (Auth. mod.)

I-47812

Dalu, G.A., Baldi, M., Colacino, M., Guerrini, A., **Climatic atmospheric outflow at the rim of the antarctic continent**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.439-452, 18 refs.

Using the Gauss theorem, the authors evaluate the intensity of the heat flux due to the cold air outflow at the rim of the antarctic continent as a function of the diabatic net cooling and of the entrainment of potentially warm air from the free atmosphere above the antarctic

surface layer. Through a further elaboration of Ball's (1960) analytical theory for the drainage flow over the elevated plateau in the interior of Antarctica, the authors evaluate the barrier effect due to the presence of isolated mountains, channeling effect in narrow valleys, and the perturbations induced by local variability of the net diabatic heat balance. The behavior of the katabatic winds in the near-coastal regions is considered in terms of the mesoscale energy theory developed by Dalu and Green (1980; 1983). Analysis shows that, within a Rossby radius from the coastline, the katabatic winds can be periodic or continuous, or can stay a long time in a quiescent near-critical state, to burst out in short strong gusts. (Auth. mod.)

I-47813

Nichol, S.E., Valenti, C., **Total ozone measurements from Scott Base, Antarctica with a Dobson and a Brewer spectrophotometer**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.469-475, 11 refs.

This study presents total ozone measurements from Scott Base for the period of Feb. 1989 to Oct. 1990, using both a Dobson and a Brewer spectrophotometer. The data considered here have been restricted to direct sun measurements. The 54 km separation in the siting of the two instruments is expected to have a minimal effect on the measurements. The results from several intercomparisons between Dobson and Brewer spectrophotometers show agreement within an rms error of 1% when the instrument calibration constants are derived calibration constants, as is the case in this study. On average, the Dobson AD direct sun measurements are between 2 and 4% higher than the Brewer direct sun measurements.

I-47814

Orsini, S., Candidi, M., Storini, M., **Correlating the auroral activity with the southern high-latitude O₃-content**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.477-490, 27 refs.

Data from the TOMS instrument on Nimbus-7 are compared with the AE time series to look for a possible connection between magnetospheric activity and the variation in extent of the area where depressed atmospheric O₃ content is observed over the high-latitude Southern Hemisphere. Preliminary results are reported; the 1984 vernal equinox is analyzed in connection with the passage at the Earth of two interplanetary perturbations. A positive correlation is found between the magnetospheric activity induced by the solar-wind macrostructures (identified by the analysis of the galactic cosmic-ray modulation) and the high-latitude global O₃ depletion. (Auth.)

I-47815

Adriani, A., Gobbi, G.P., Viterbini, M., Ugazio, S., **Combined observations of tropospheric and stratospheric thin clouds at McMurdo, Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.491-503, 15 refs.

A balloon-borne sonde and a lidar have been developed to make combined observations of thin tropospheric and stratospheric clouds. This combined experiment has been set up to study antarctic polar stratospheric clouds, the cloud layer deeply involved in the process of the ozone hole. The sonde collects cloud particles larger than 4 microns on a transparent impactor; shape, dimension and size distribution of the particles are obtained from these frames. The lidar provides complementary information about PSC optical depth, backscattering, depolarization, vertical distribution and temporal evolution. Balloon launches are made upon lidar detection of PSCs. Characteristics of both instruments are described. The first version of the experiment was tested during a winter campaign at McMurdo Station. Preliminary results are presented. (Auth.)

I-47872

Amos, A.F., **AMLR program: Meteorological conditions in the vicinity of Elephant Island**, *Antarctic journal of the United States*, 1991 26(5), p.213-215, 6 refs.

Continuous meteorological data (wind speed and direction, barometric pressure, air temperature, and humidity) were collected around Elephant I. Two methods of presenting the data are given here. A figure shows the data as a function of time without regard to position. The time period covers AMLR 91, leg 1 from Jan. 16-Feb. 11, 1991, including Drake Passage crossings at the start and end of the leg. In the Elephant I. region, the northwesterly winds bring warmer air and the air temperature is consistently warmer than the sea surface. In another figure, data are presented (as if it were synoptic) for the latter part of Jan. in both 1990 and 1991, when winds were consistently northeasterly for 7 days in Jan. 1990 and west to northwesterly for 14 days in Jan. 1991.

I-47885

Crane, R.G., **Remote sensing and polar climate**, *Earth and mineral sciences*, Spring 1986 55(3), p.38-41, 6 refs.

The increased understanding of the role of polar regions in effecting and affecting changes in global climate is reviewed. It is suggested that this influence may be starting to surpass that of tropical regions to do the same thing. In assessing the roles of the arctic and antarctic areas, the use of remote sensing tools in the analyses of observations of sea ice, polar clouds, and the relationships between them is judged to be one of the most significant advances in learning, because of the larger areas that can be monitored more frequently and more quickly.

I-47892

Delmas, R.J., **Polar precipitation chemistry**, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1669-1691, Includes discussion. Refs. p.1686-1690.

DLC QC882.4.P74

Satisfactorily balanced ion budgets are now available for antarctic and Greenland precipitation. The records of the two major biogenic sulfur species (sulfate and methanesulfonate ions) in polar ice document the past and present sulfur cycle in remote areas. In particular, it has been proposed recently that El Niño events modulate the concentrations of methanesulfonate in South Pole snow. Volcanos represent sporadic but significant contributors to the polar sulfur budget. Nitrate data is still incompletely interpreted, but a stratospheric source linked with the antarctic ozone hole seems to be likely. For both nitrate and sulfate, the anthropogenic contribution is now significant, at least in Greenland. "New" compounds such as H₂O₂ and HCHO linked with the oxidation potential of the atmosphere are now easily detectable at ppb levels in polar snow. (Auth. mod.)

I-47893

Gillette, D.A., **Are changes in dust sedimentation to polar regions a sign of dust production due to a climatic sensitive variable or more efficient atmospheric transport? And where does the dust come from**, International Conference on Precipitation Scavenging and Atmosphere-Surface Exchange Processes, 5th, Richland, WA, July 15-19, 1991. Proceedings, Vol.3, Washington, D.C., Hemisphere Publishing Corporation, 1992, p.1719-1732, Includes discussion. 25 refs.

DLC QC882.4.P74

Polar region deposition changes may be caused by climate-sensitive changes in the strength of dust sources and of transport. Change of transport sensitivity was tested by finding differences in transport for different seasons of dust input. Sensitivity to climate change of

dust source strength was inferred by examining the equations for dust emission. Magnitudes of measured differences of dust sedimentation suggest that change of source strength is a more probable cause of variable ice core concentrations than changes of transport efficiency. (Auth.)

I-47910

Ohtake, T., **Freezing points of H₂SO₄ aqueous solutions and formation of polar stratospheric clouds**, International Conference on Nucleation and Atmospheric Aerosols, 13th, Salt Lake City, UT, Aug. 24-28, 1992. Proceedings. Edited by N. Fukuta et al, Hampton, VA, A. Deepak Publishing, 1992, p.233-236, 9 refs.

DLC QC921.6.C6 N83

The freezing temperature of H₂SO₄ aqueous solutions as a function of concentration was measured as a preliminary investigation of the ice nucleation of natural sulfuric acid mixed aerosols. Based on these measurements, it is proposed that the formation of ice crystals in cirrus and polar stratospheric clouds is the result of the condensation of water vapor and subsequent freezing of natural sulfuric acid aerosols. Results are also related to ice crystal formation in the antarctic atmosphere. (Auth. mod.)

I-47928

Préndez, M., **Aerosol role in the ozone hole** [Atmósfera antártica: alcances sobre el rol de los aerosoles en el agujero de ozono], *Boletín antártico chileno*, Oct. 1992 11(2), p.10-12, In Spanish. 8 refs.

After reviewing the mechanics of ozone depletion, the author examines theories explaining the phenomenon. It is concluded that the presence of aerosols in the stratosphere, whose origin is attributed partially to volcanic eruptions, is fundamental in accounting for the antarctic ozone hole, and that it is to be expected that the 1991 eruption of the Hudson volcano will contribute significantly to ozone depletion in the Southern Hemisphere over several years.

I-47931

Macphail, M.K., Colhoun, E.A., Kiernan, K., Hannan, D., **Glacial climates in the antarctic region during the Late Paleogene: evidence from northwest Tasmania, Australia**, *Geology*, Feb. 1993 21(2), p.145-148, 23 refs.

Published data suggest that ice buildup commenced in Antarctica during the late middle Eocene. This predates by 30 m.y. the earliest evidence of Cenozoic glaciation on other fragments of Gondwana although several of these were at high latitudes during the Paleogene. New evidence is presented for local glacier development during the late Paleogene in Tasmania, then a mountainous peninsula at about lat. 55-63S, projecting into the circum-antarctic ocean. The date of glaciation is not precisely known, but an earliest Oligocene age is indicated. That episode may correlate with abrupt cooling of the sea surface surrounding Antarctica during the earliest Oligocene (about 36 Ma). (Auth.)

I-47940

Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, **Preprints**, Boston, American Meteorological Society, 1992, 146p. + joint papers, Refs. passim. Includes joint papers with the 10th Symposium on Turbulence and Diffusion and the 6th Conference on Mountain Meteorology. For selected papers see 47-868, 47-880, and 47-2363 through 47-2423, or 20I-47297, F-47945, I-47941 through I-47944, I-47946 through I-47952, I-47954 through I-47957 and J-47953.

This is a collection of papers presented at the 3rd Conference on Polar Meteorology and Oceanography held in Portland, OR, Sep. 29-

Oct. 2, 1992. The papers, 17 of which are pertinent to Antarctica, cover all topics of interest in polar meteorology, with special emphasis on katabatic and mountain winds and on polar boundary layers.

I-47941

Rossow, W.B., **Polar cloudiness: some results from ISCCP and other cloud climatologies**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.1-3, 15 refs.

The argument is made that in cloud climatologies of the polar regions, there are not only large differences in average cloud amount, there is also no agreement on the sense of the seasonal variations. From tabulated data and a figure showing the comparisons of the ISCCP and SOBS datasets for both poles, together with some re-analyses of the surface observation datasets to correct for difficulties in winter-time cloud observation, it is concluded that there is no accurate indication of the amount and nature of polar cloudiness.

I-47942

Walden, V.P., Heuberger, R., Warren, S.G., Murcray, F.J., **Atmospheric longwave radiation spectrum on the antarctic plateau**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.11-12, 5 refs.

To establish what controls the longwave radiation budget of Antarctica and to offer data from a cold, dry atmosphere for use in testing spectral radiation models and radiation codes in climate models, the downward infrared spectral radiance from 6 to 17 microns is being measured at the Amundsen-Scott Station throughout the year. Analysis of data and application of datasets to testing general circulation models are discussed.

I-47943

Bromwich, D.H., Carrasco, J.F., Liu, Z., **Katabatic surges across the Ross Ice Shelf, Antarctica: atmospheric circulation changes and oceanographic impacts**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.29-32, 17 refs.

An immediate effect of the northwestward propagation of the katabatic airflow is the formation, enlargement and/or maintenance of the coastal polynya offshore from the Ross Ice Shelf. A figure shows the average northern limit of the polynya for 22 random non-signature days and for all the signature days. The average areal extent of the polynya observed along the entire northern edge of the Ross Ice Shelf for signature days was larger than the average extent for non-signature days. This difference is more pronounced on the west side of the ice shelf, where the polynya on signature days can be almost twice as large as the polynya on non-signature days. The persistence of the polynya just to the northern edge of the Ross Ice Shelf is associated with the south and southeasterly winds blowing offshore from the ice shelf. It is noted that the northward propagation of the katabatic winds from West Antarctica, accompanied by intensification of the airflow coming from East Antarctica, plays an important role in the behavior of the Ross Sea polynya.

I-47944

Hogan, A.W., Stearns, C.R., Weidner, G.A., **Meteorological surveys in support of ice airfields in Antarctica**, MP 3216, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.42-43, 9 refs.

Meteorological analysis indicates that katabatic winds, accelerating downslope from the polar plateau, erode snow cover to expose glacial ice at these places. The associated katabatic warming reduces the relative humidity of the near-surface air, facilitates ablation of the ice surface, and maintains dryness. Pebbles of 5 cm diameter are dispersed about the smooth ice surface proposed for use as a runway near Mt. Howe, the site nearest the South Pole. The movement of these rocks from the nearby exposed ground is evidence of occasional strong winds. The authors briefly describe some current observations, analysis of fragmentary data from recent and historic visits to the area, and their analytical approach to establishing the length of meteorological summer in this region.

I-47946

Stearns, C.R., Weidner, G.A., **Climatic differences in Antarctica from automatic weather stations**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.111-114, 8 refs.

It is proposed that the climate at McMurdo should not be used to infer the climate at any other nearby location; the air temperature is warmer and the wind speed and direction are strictly local phenomena because of the air flow over the Hut Point Peninsula. On the Ross Ice Shelf there are significant differences in mean air temperature in the horizontal, so the Ross Ice Shelf cannot be described as a uniform climatic region. The annual sublimation of moisture differs significantly in the horizontal. There is a tendency for high sublimation regions to have low annual accumulation which tends to smooth out the annual precipitation. It is suggested that the assumption that annual sublimation and deposition cancel out anywhere in Antarctica should be discarded completely.

I-47947

Neff, W.D., **On the influence of stratospheric stability on lower tropospheric circulations over the South Pole**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.115-120, 22 refs.

Observations of solar radiation and cloudiness at the South Pole have revealed a significant increase in cloud cover and decrease in solar radiation during Jan. and Feb., beginning in the early 1980s. That this change occurred in concert with extended periods of reduced ozone in the spring stratosphere over Antarctica stimulated the preliminary analyses described here. The rawinsonde data obtained at Amundsen-Scott Station for the period 1961 through 1990 have revealed a 30-yr trend in lower stratospheric lapse rate overlain with a strong interannual variability suggestive of quasi-biennial and longer oscillations.

I-47948

Smith, S.R., Stearns, C.R., **Antarctic pressure and temperature anomalies surrounding the minimum in the southern oscillation index**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.121-124, 7 refs.

It is suggested that there may be a relationship between the Southern Oscillation and meteorological events in Antarctica, and that the areas of interest could be the Ross and Amery Ice Shelves. The following is recommended: automatic weather stations, deployed on the Ross Ice Shelf since 1980, should be continued; the Amery Ice Shelf should have automatic weather stations installed; the katabatic flow from Antarctica should be monitored continuously by automatic weather stations with help from satellites; the possible relationship between the katabatic flow on Antarctica and the SO should be determined; automatic weather stations should be located along the coast

of West Antarctica from 180 to 85W to cover part of the meteorological void; and the data from the automatic weather stations should be related to the ENSO as the ENSO events occur.

I-47949

Egger, J., **Mountain effects on the antarctic circulation**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J3-J7, 12 refs. Joint paper with the 6th Conference on Mountain Meteorology.

Like any other major mountain massif on earth, antarctic orography induces atmospheric responses at all scales of motion. There are strong katabatic flows, gravity waves, "lee cyclones" and topographically excited Rossby waves. However, Antarctica is unique in that a strong axisymmetric flow regime is attached to the continent: inversion flows in the boundary layer are downward to the coast almost all around Antarctica with corresponding mean sinking throughout the troposphere in the interior and ascent near the coastline. The idea that the transient waves entering the antarctic domain are modified by the topography, such that they are capable of transporting angular momentum out of Antarctica, is discussed.

I-47950

Quintanar, A.I., Mechoso, C.R., **Generation mechanisms of quasi-stationary waves in the Southern Hemisphere**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J8-J11, 5 refs. Joint paper with the 6th Conference on Mountain Meteorology.

The generation mechanisms for planetary waves in the extratropical troposphere of the Southern Hemisphere is investigated, with emphasis on QS-wave 1. Two basic questions are addressed: to what extent is the quasi-stationary wave field sensitive to the orographic elevations, particularly those of Antarctica, and what is the relative influence of forcing by orography and surface conditions other than orography on the structure of the quasi-stationary wave field. To investigate these questions, an atmospheric general circulation model (the UCLA-AGCM) and a barotropic model on the sphere are used.

I-47951

Neff, W.D., **Synoptic influence on inversion winds at the South Pole**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J24-J28, 7 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.

In anticipation of a new study to be carried out in the austral winter of 1993 using 915-MHz radar wind profilers with continuous temperature profiling in the boundary layer, this paper reexamines earlier results from 1977 and 1978 that used acoustic sounding and one-dimensional numerical modeling. In addition, the availability of Amundsen-Scott Station rawinsonde data from 1961 through 1991 has provided an opportunity to view these limited data in the context of long-term changes in the synoptic environment at the South Pole.

I-47952

Liu, Z., Bromwich, D.H., **Acoustic remote sensing study of boundary layer blocking near Ross Island, Antarctica**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J29-J32, 13 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.

Ross I. is located along the northwestern edge of the Ross Ice Shelf. Three peaks of more than 2000 m elevation, Mts. Erebus,

Terra Nova and Terror, form a high, steep obstacle to the prevailing southerly winds. Rawinsonde data collected at McMurdo Station are not suitable for detailed study of the planetary boundary layer because of their poor height resolution and inconsistent launches. An acoustic radar, or sodar, overcomes these limitations by providing continuous three-dimensional wind profiles up to an altitude of several hundred meters.

I-47954

Bromwich, D.H., Ganobcik, S.N., **Katabatic wind dynamics at Terra Nova Bay, Antarctica from the satellite image perspective**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J125-J128, 19 refs. Joint paper with the 6th Conference on Mountain Meteorology.

During aircraft flights across the Nansen Ice Sheet near Terra Nova Bay, it was found that strong katabatic winds and negatively-buoyant air at the 170 m flight level co-existed with warm thermal infrared satellite signatures. Here these satellite signatures are used to study the dynamics of surface winds in the Terra Nova Bay area during the 1988 winter.

I-47955

Carrasco, J.F., Bromwich, D.H., **Case studies of katabatic wind forced mesoscale cyclogenesis over the southwestern Ross Sea**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J129-J132, 15 refs. Joint paper with the 6th Conference on Mountain Meteorology.

Two katabatic wind cases are discussed. They show that cold katabatic airstreams blowing from Terra Nova Bay into the much warmer and maritime environment over the southwestern Ross Sea often create mesoscale cold fronts which, in conjunction with a weak surface trough, constitute sufficient conditions for mesoscale cyclogenesis. Also, results indicate that near-surface warm air advection over the southwestern Ross Sea by the synoptic-scale circulation may sharpen the mesoscale cold front and be associated with mesoscale cyclogenesis. It is suggested that weak upper-level support associated with the approach of midtropospheric troughs or cyclones seems to be the trigger for the formation of mesoscale vortices. Without this upper-level synoptic support, mesocyclones seem to weaken rapidly once they move away from their point of origin, suggesting that their subsequent development is also determined by midtropospheric troughs that circle the circumpolar vortex over the Ross Sea/Ross Ice Shelf area. The mechanisms that govern the displacement of the mesocyclones are not clearly understood. It seems that they are steered by the initial low-level circulation.

I-47956

Bromwich, D.H., Du, Y., Parish, T.R., **Numerical simulation of katabatic winds crossing the Siple Coast area of West Antarctica**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J137-J140, 20 refs. Joint paper with the 6th Conference on Mountain Meteorology.

Numerical simulations of katabatic winds have been conducted using a three-dimensional primitive equation model. Antarctic ice topography at 20 km resolution has been utilized and resolves all the topographically-important terrain features in the model domain. The terrain-induced katabatic winds are well simulated. The model results suggest that the surface wind pattern over the antarctic interior is little affected by synoptic-scale disturbances centered beyond the ice-sheet margin. The model produces the well-known confluence

zones around the antarctic coast. The simulated katabatic surges are in good agreement with the satellite analyses that show the katabatic winds blowing across the flat Ross Ice Shelf with some geostrophic characteristics. The model suggests that the katabatic surges are mainly fed by cold air masses coming from the Siple Coast area of West Antarctica and from the Byrd Glacier part of East Antarctica. This is in agreement with the satellite imagery interpretation.

I-47957

Parish, T.R., Pettfe, P., Wendler, G., **On the interaction between the katabatic wind regime and large-scale tropospheric forcing near Adelie Land, Antarctica**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J141-J144, 8 refs. Joint paper with the 6th Conference on Mountain Meteorology.

In this paper the authors investigate the interaction between the antarctic katabatic wind regime and the large-scale horizontal pressure field, using observational evidence as well as results from a two-dimensional primitive equation model. Results are in agreement with numerous observations which suggest that the katabatic wind is essentially unidirectional.

I-47959

Farrara, J.D., Fisher, M., Mechoso, C.R., O'Neill, A., **Planetary-scale disturbances in the southern stratosphere during early winter**, *Journal of the atmospheric sciences*, Sep. 15, 1992 49(18), p.1757-1775, 30 refs.

The early winter (mid-Apr. to mid-July) circulation in the Southern Hemisphere stratosphere is studied. Emphasis is placed on the evolution of strong disturbances with structures dominated by the zonal wavenumber-1 component of the flow (wave 1). The approach to this investigation is based on analysis of 12 years (1979-90) of observational data and comparative analyses of control and hypothesis-testing simulations with a three-dimensional primitive equation model of the stratosphere and mesosphere. Considerable interannual variability is found in both the intensity and timing of wave 1 amplification during early winter. Owing to their geographical preference for development over the South Pacific, wave 1 events in the southern stratosphere during early winter are referred to as South Pacific warmings. The hypothesis-testing simulations suggest that the development of South Pacific warmings is connected with the amplification of wave 1 at 100 mb, and that the eastward propagation of the disturbances requires eastward propagation of wave 1 at 100 mb. In addition, the results suggest that development of stratospheric disturbances in the southern stratosphere during early winter depends more on the intensity of wave 1 at 100 mb than on the structure of the zonal-mean flow in the stratosphere.

I-48014

Adriani, A., Gobbi, G.P., Viterbini, M., Ugazio, S., **Combined system for observations of tropospheric and stratospheric thin clouds**, *Journal of atmospheric and oceanic technology*, Feb. 1993 10(1), p.34-40, 14 refs.

A balloonborne sonde and a polarization lidar have been developed to make combined observations of thin tropospheric and stratospheric clouds. In their first application these instruments have been used in a campaign to study antarctic polar stratospheric clouds (PSCs), which are implicated in the process of ozone depletion. The sonde collects cloud particles larger than 4 microns in diameter on a transparent impactor and observes them by means of a CCD (charge coupled device) camera microscope. Images are transmitted in real time to the ground station for recording and analysis. Shape, dimension, and size distribution of the particles are obtained from these frames. The lidar provides complementary information about the cloud optical depth, backscattering, depolarization, vertical distribu-

tion, and temporal evolution. Characteristics of both instruments are described. The experiments performed during the 1990 spring campaign at McMurdo Station are discussed, and some results are reported to show the capabilities of the combined system. (Auth. mod.)

I-48028

Deshler, T., Adriani, A., Hofmann, D.J., Gobbi, G.P., **Evidence for denitrification in the 1990 antarctic spring stratosphere: II. Lidar and aerosol measurements**, *Geophysical research letters*, Nov. 1991 18(11), p.1999-2002, 10 refs.

Balloonborne aerosol soundings from McMurdo Station in 1990 documented the occurrence of polar stratospheric clouds (PSCs) during both fast and slow cooling events as well as the background stratospheric sulfate aerosol. PSCs formed under slow cooling predominated and in this case the size distributions were found to be bimodal with mode radii of 0.08 and 2-3 microns, similar to previous measurements in Antarctica. The aerosol soundings were also compared to lidar measurements at McMurdo in three cases. In the one PSC layer formed from fast cooling, the best agreement between measured and calculated scattering ratio was found using an index of refraction of 1.37, suggesting an amorphous nitric acid/water composition rather than crystalline nitric acid trihydrate. For the background aerosol, calculations using an index of 1.5 were generally in best agreement with the measured values. (Auth.)

I-48080

Solomon, S., **Visible and near-ultraviolet spectroscopy at McMurdo Station, Antarctica. 8. Observations of nighttime NO₂ and NO₃ from April to October 1991**, *Journal of geophysical research*, Jan. 20, 1993 98(D1), p.993-1000, 34 refs.

Lunar absorption spectra have been used to determine the vertical column abundances of NO₂ and NO₃ above McMurdo Station during the fall, winter and spring seasons in 1991. The observed nighttime NO₂ and NO₃ amounts during the fall and spring were broadly consistent with model predictions and with daytime measurements. During winter, local photochemistry would imply a long polar night, with associated gradual removal of NO₂ and buildup of NO₃ and N₂O₅. The winter observations of both species differ from such simple predictions by factors greater than 10, with the measured NO₂ being far larger than predicted while the measured NO₃ is much smaller than predicted. The concurrent measurements of both NO₂ and NO₃ strongly constrain possible solutions for these discrepancies, and suggest that air parcel excursions to sunlit lower latitudes likely take place quite regularly throughout the winter (approximately every 3-7 days). Thus the concept of an extended period of polar night as often applied in modeling studies of polar photochemistry appears inconsistent with these observations. (Auth.)

I-48081

Collins, R.L., Bowman, K.P., Gardner, C.S., **Polar stratospheric clouds at the South Pole in 1990: lidar observations and analysis**, *Journal of geophysical research*, Jan. 20, 1993 98(D1), p.1001-1010, 24 refs.

Polar stratospheric clouds (PSCs) were first observed in late May at about 20 km. As the lower stratosphere cooled further, PSCs were observed throughout the 12-27 km altitude region, and remained there from mid-June until late Aug. Observations in early Sep. detected no PSCs above 21 km. An isolated cloud was observed in mid-Oct. Throughout the winter the clouds had small backscatter ratios (<10). Observations made at two wavelengths in July show that the clouds are predominantly composed of nitric acid trihydrate with associated angstrom coefficients between 0.2 and 3.7. Comparison of the lidar data and balloon-borne frost point measurements in late Aug. indicate

that the nitric acid mixing ratio was less than 1.5 ppbv. Observations over periods of several hours show downward motions in the cloud layers similar to the phase progressions of upwardly-propagating gravity waves. The vertical phase velocities of these features are significantly faster than the expected settling velocities of the cloud particles. Both the backscatter ratio profiles and the radiosonde horizontal wind profiles show 1-4 km vertical structures. This suggests that the kilometer-scale vertical structure of the PSCs is maintained by low-frequency gravity waves propagating through the cloud layers. (Auth. mod.)

I-48082

Byrne, G.J., **Ground-based instrumentation for measurements of atmospheric conduction current and electric field at the South Pole**, *Journal of geophysical research*, Feb. 20, 1993 98(D2), p.2611-2618, 10 refs.

The authors have constructed instruments to measure the atmospheric conduction current and the atmospheric electric field: two fundamental parameters of the global-electric circuit. The instruments were deployed at the Amundsen-Scott South Pole Station in Jan. 1991 and are designed to operate continuously for up to one year without operator intervention. The atmospheric current is measured by a sensor that uses a split-hemispheric conducting shell of 17.8 cm radius, separated by a thin Teflon insulating disk. The detection electronics are inside the sphere. In principle, the atmospheric current flows into one hemisphere, through the electronics where it is measured, and out the other hemisphere. The electric field is measured by a field mill of the rotating dipole type. The electric field sensing elements are two 30 cm-long antennas, driven to rotate in the vertical plane at 1800 rotations per minute. Two arrays of identical instruments have been deployed, separated by 600 m, in order to distinguish between atmospheric electrical signals of local and global origin. The separation distance of the arrays was determined by the climatology of the antarctic plateau. Sample data from the first days of operation at the South Pole indicate variations in the global circuit over time scales from minutes to hours to days.

I-48083

Joussaume, S., **Paleoclimatic tracers: an investigation using an atmospheric general circulation model under ice age conditions. 1. Desert dust**, *Journal of geophysical research*, Feb. 20, 1993 98(D2), p.2767-2805, 73 refs.

Many studies with atmospheric general circulation models (AGCMs) have demonstrated their usefulness in reconstructing past climates. In a new approach, the author used an AGCM to investigate the link between tracer cycles and climate. Considered in this paper are the atmospheric cycle of windblown dust material from desertic areas and in part 2 the water isotope cycles. Studies from ice cores have shown a strong increase of dust deposits during glacial periods, both over East Antarctica and Greenland. It is not known, however, whether this past increase is global or just a local feature; where the dust came from; and what are the mechanisms yielding this increase. Answers to these questions are sought by using an AGCM including a model for the desert dust cycle to simulate the present-day and Last Glacial Maximum climates for Feb. and Aug. The model simulates only a weak increase of the global atmospheric dust content. Stronger variations are obtained at a regional scale and are in good agreement with observations from deep-sea sediments. However, the model does not reproduce the great increase of dust concentration in snow that has been observed in ice cores. Several model deficiencies can induce this model-data discrepancy, as for example inaccuracies of the circulation patterns or of the dust model. However, most likely the model fails to simulate the actual sources of dust. (Auth.)

I-48089

Tzeng, R.Y., Bromwich, D.H., Parish, T.R., **Present-day antarctic climatology of the NCAR Community Climate Model Version 1**, *Journal of climate*, Feb. 1993 6(2), p.205-226, 51 refs.

Five-year seasonal cycle output produced by the NCAR Community Climate Model Version 1 (CCM1) is used to evaluate the ability of the model to simulate the present-day climate of Antarctica. The model results are compared with observed horizontal syntheses and point data. (Auth. mod.)

I-48090

Connolley, W.M., King, J.C., **Atmospheric water-vapour transport to Antarctica inferred from radiosonde data**, *Royal Meteorological Society. Quarterly journal B*, Jan. 1993 119(510), p.325-342, 34 refs.

Data from 16 radiosonde stations are used to study the transport of water vapor in the antarctic atmosphere. Total column moisture (TCM), winds and moisture flux measurements are presented, together with an analysis of their reliability. Annual TCM values are similar at all stations around the coast of East Antarctica, but are much smaller on the East Antarctic Plateau. Over a period of 6 years the interannual variation (standard deviation) of the TCM is about 10% of the mean value. From the data a water-vapor budget for East Antarctica is computed. The annual accumulation rate obtained approximates glaciological estimates. However, the uncertainties are considerable as a result of measurement errors and the representativity of the stations available. The conclusion is that the data are more suitable for evaluating the regional performance of circulation models from which systematic budget estimates may be derived. (Auth. mod.)

I-48105

Gruzdev, A.N., Elokhov, A.S., **Surface ozone concentration at the Molodezhnaya and Mirnyy antarctic stations based on measurements conducted in Spring 1987 through Fall 1988**, *Izvestiya. Atmospheric and oceanic physics*, Aug. 1992 28(1), p.41-47, Translated from *Izvestiia. Fizika atmosfery i okeana*. 29 refs.

Results of surface ozone concentration measurements conducted at the Molodezhnaya and Mirnyy stations from spring 1987 through fall 1988 are reported and discussed together with results from airborne ozone measurements in the surface layer along the Mirnyy-Vostok-Mirnyy route (a single overflight). Daily, day-to-day, and annual ozone variability mechanisms are examined. Specifically, it is determined that the ground level of ozone positively correlates with temperature above the boundary layer in the synoptically active period as well as with the surface katabatic wind direction in the synoptically quiescent period.

I-48106

Kenner, R.D., Plumb, I.C., Ryan, K.R., **Laboratory measurements of the loss of ClO on Pyrex, ice and NAT at 183 K**, *Geophysical research letters*, Feb. 5, 1993 20(3), p.193-196, 17 refs.

The rate of loss of ClO on Pyrex, water ice and nitric acid trihydrate (NAT) surfaces at 183 K was measured in a flow reactor sampled by a mass spectrometer. Upper limits for the rates of loss of ClO on Pyrex at 295 K, Cl₂ on ice at 183 K and O₃ on Pyrex, ice and NAT surfaces at 183 K have also been determined. In all cases the probability of loss of the species from the gas-phase upon collision with the surface is less than .0001. These small values make it probable that heterogeneous reactions involving these species are unimportant in the winter polar stratosphere. (Auth. mod.)

I-48107

Nelson, D.D., Jr., Zahniser, M.S., Kolb, C.E., **OH reaction kinetics and atmospheric lifetimes of CF₃CFHCF₃ and CF₃CH₂Br**, *Geophysical research letters*, Feb. 5, 1993 20(2), p.197-200, 22 refs.

Bromine-catalyzed ozone destruction plays a disproportionately large role in the catalytic destruction of stratospheric ozone. Bromine may be responsible for as much as 30% of the observed antarctic ozone loss, and perhaps an even larger share of the global ozone decline of the last decade. It is believed that on an atom-for-atom basis bromine is 30-100 times more effective at destroying ozone than is chlorine, at the current chlorine concentration. This paper reports laboratory measurements of the rate constants for the reaction of the OH radical with CF₃CFHCF₃ and with CF₃CH₂Br as a function of temperature, using the discharge of the OH radicals. Atmospheric lifetimes for CF₃CFHCF₃ and CF₃CH₂Br are found to be 42 years and 4.1 years, respectively. The steady-state ozone depletion potential of the brominated species relative to CFC13 is estimated to be -0.84 using a semi-empirical model. (Auth. mod.)

I-48132

Fantini, M., Buzzi, A., **Numerical experiments on a possible mechanism of cyclogenesis in the antarctic region**, *Tellus*, Mar. 1993 45A(2), p.99-113, 18 refs.

Polar lows are observed to form in the circum-antarctic ocean, where strong meridional thermal contrast in the atmosphere is normally associated with large heat fluxes from the sea. In the present study, using a two-dimensional non-hydrostatic model, an examination is made of the growing stage of disturbances that bear many characteristics in common with observed polar lows, as for example, warm mesoscale updrafts where the latent heat is released. It is shown here that such growing disturbances do not depend for their structure and scale on the initial condition chosen. Growth rates are considerably larger than those of modes in the absence of surface heat fluxes, and may be sustained for several days. (Auth.)

I-48145

Gruzdev, A.N., Sitnov, S.A., **Anomalies in the intra-annual ozone variability in polar regions from ozone sounding area: Resolute and Amundsen-Scott stations**, *Akademiia nauk SSSR. Izvestiya. Atmospheric and oceanic physics*, 1991(Pub. Nov. 91) 27(4), p.272-279, Translated from *Akademiia nauk SSSR. Izvestiia. Fizika atmosfery i okeana*. 31 refs.

The intra-annual ozone variability in the northern and southern polar regions is analyzed from ozone sounding data at Resolute and Amundsen-Scott Stations. Specifically, anomalies associated with winter stratospheric warmings, stratospheric-tropospheric exchange, and the isolated evolution of surface ozone have been identified for the Arctic. Isolated ozone evolutionary regimes in different atmospheric layers, including the O₃ maximum layer and the troposphere, are characteristic of Antarctica. Such regimes are manifested as a springtime ozone "hole" and in an antiphase annual progression of lower-tropospheric and upper-tropospheric O₃. Correlations between the ozone level and temperature are investigated in different seasons, which make it possible in many cases to specify the mechanisms behind ozone variability. (Auth.)

I-48147

Stamnes, K., **Several-fold enhancement of biologically effective ultraviolet radiation levels at McMurdo Station, Antarctica during the 1990 ozone "hole"**, *Geophysical research letters*, May 22, 1992 19(10), p.1013-1016, 24 refs.

Spectral measurements of biologically relevant radiation at McMurdo Station reveal ultraviolet (UV) irradiance levels at 305 nm

in Oct. exceeding by a factor between 3 and 6 the "normal" values expected for undepleted ozone levels. This enhancement is directly related to the ozone depletion. The column abundance of stratospheric ozone derived from these measurements was as low as 145 Dobson units (DU) in Oct., 1990. This is more than a factor of 2 lower than the value at solstice, and 100 DU less than in Oct., 1988. The dose rate for damage to the DNA molecule based on Setlow's action spectrum and UV radiation measured at noon is well above normal levels most of the time between Oct. 1 and Dec. 5, and is up to three times the normal value for a few days at the end of Oct. (Auth.)

I-48148

Remy, F., Ledroit, M., Minster, J.F., **Katabatic wind intensity and direction over Antarctica derived from scatterometer data**, *Geophysical research letters*, May 22, 1992 19(10), p.1021-1024, 17 refs.

Although satellite radar scatterometers are initially designed to measure ocean surface wind speed and direction, they also provide important observations over continental ice sheets. Data from the Seasat scatterometer analyzed over a sector of Antarctica show that the signal is strongly dependent on the incidence angle of observation, but that it also depends on azimuth. The minimum values of the backscatter coefficient (the ratio of backscattered versus incident power) are always observed in the direction of katabatic winds. A theoretical analysis shows that the backscatter coefficient must be very sensitive to the sastrugi slopes and orientations, which are streamlined features formed on the snow surface in the wind direction. Satellite scatterometers can thus map the characteristics of sastrugis, of importance for the interpretation of microwave measurements above ice sheets; this indirectly provides the intensity and direction of these very persistent and strong winds, which play an important role in the behavior of the atmosphere and ocean in high southern latitudes. (Auth.)

I-48156

Tuhkanen, S., **Climate of Tierra del Fuego from a vegetation geographical point of view and its ecoclimatic counterparts elsewhere**, *Acta botanica fennica*, 1992 Vol.145, p.1-64, Refs. p.58-64.

The climatic features of Tierra del Fuego are determined by its upper mid-latitude location within the belt of prevailing westerlies, in the path of eastward moving cyclones and not very far from the antarctic ice. It is surrounded by oceans in three directions, lacking marked continental influences. Tierra del Fuego may constitute part of the "antarctic" or "subantarctic" (not corresponding to "subarctic") or "austral" or "temperate" zone. Here, the term "antiboreal" is advocated. It is desirable to develop an inter-hemispherically uniform system of ecoclimatic regions. A cube model describing the spatial variation of vegetation in relation to the major climatic gradients (amount of heat, oceanity/continentality and humidity/aridity) is used to establish a system of climatic-phytogeographical regions in Tierra del Fuego and to determine their ecoclimatic counterparts, among which figure the subantarctic islands. (Auth. mod.)

I-48158

Levy, G., Brown, R.A., **Southern Hemisphere synoptic weather from a satellite scatterometer**, *Monthly weather review*, Dec. 1991 119(12), p.2803-2813, 37 refs.

Analyses of remotely sensed wind vector data from six satellite passes over parts of the southern ocean during Sep. 1978 are shown. Winds are input to a planetary boundary layer model to produce sea level pressure fields. These are compared to the Australian Bureau of Meteorology conventional mean sea level pressure and to the European Centre for Medium Range Weather Forecasts pressure analyses. The analyses suggest that the Southern Hemisphere synoptic-scale pressure gradients for the cases studied are significantly stronger than

those analyzed by the weather services. Compared to the Northern Hemisphere, serious deficiencies in all analysis schemes are revealed. However, it appears that remotely sensed data added to standard analysis techniques and satellite imagery can greatly enhance analysis and prognosis in remote oceanic regions and improve climatological flux estimates in the Southern Hemisphere. (Auth.)

I-48160

Belitz, H.-J., Kottmeier, C., **Meteorological research using a high mast on an antarctic ice shelf**, *Marine technology*, 1987 18(1), p.5-10, With German summary. 13 refs.

In Jan. 1983 a meteorological mast 45 m in height was erected at the Georg von Neumayer Station to study processes in the atmospheric boundary layer. The scientific objectives and the layout of the measuring system are presented. Basic difficulties in erecting and anchoring the mast are discussed. The investigation of two specific processes is described in order to demonstrate the capabilities of the measuring system. (Auth. mod.)

I-48161

Lee, B.Y., Chang, I.S., **Studies on the characteristics of meteorological phenomena and cold wave at King Sejong Station, Antarctica**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.1-16, In Korean with English summary. 6 refs.

Meteorological observations carried out at King Sejong Station since 1988 are reported. Data obtained during 1991 are presented in tables and include the following: monthly averages and highest and lowest values for atmospheric temperature and pressure, wind speed and direction (m/s), relative humidity (%), cloudiness, dewpoint temperature, snowfall (cm), and number of blizzards. Surface analysis weather charts for Aug. 1991, when the record low temperature of -28.7°C was recorded since the meteorological observations began on King George I., are also shown.

I-48175

Sivkov, A.M., Shved, G.M., **Influence of latitudinal and longitudinal variations of ozone and water vapour on the solar semidiurnal tide**, *Journal of atmospheric and terrestrial physics*, May 1993 55(6), p.815-826, 36 refs.

A new tidal source model, based on climatological global ozone and water vapor distributions, has been obtained for Jan., Apr., July and Oct. The source model is used for modeling the solar semidiurnal tide in the lower thermosphere within the framework of classical tidal theory. The observed phase quasibimodality of the semidiurnal tide at mid-latitudes is possibly formed, to a great extent, by two types of hemispheric asymmetry (changing sharply near the equinox) of the ozone distribution. Near 95 km at mid-latitudes, the ozone and water vapor distribution nonzonality yields typical values of about 2 m/s for maximum longitudinal variations of the zonal and meridional wind amplitudes, and a range about 0.2-0.5 h for maximum longitudinal phase variations in the Northern Hemisphere, while they can reach about 10 m/s and about 1.5 h in the Southern Hemisphere. The hemispheric asymmetry is mainly caused by the effect of the water vapor tidal source. (Auth.)

I-48176

Portniagin, I.U.I., **Dynamics of the antarctic and arctic mesosphere and lower thermosphere regions, I. The prevailing wind**, *Journal of atmospheric and terrestrial physics*, May 1993 55(6), p.827-841, 27 refs.

The dynamics of the antarctic and arctic mesopause regions (ca. 95 +/- 15 km) are investigated through comparative analyses of winds measured by radars at the Scott Base, Molodezhnaya, and Mawson stations in the Antarctic, and the near-conjugate stations of Heiss I. and Poker Flat in the arctic region. The data were analyzed specifically to delineate hemispheric differences in mean monthly

prevailing wind climatologies, and show the circulation systems in the arctic and antarctic mesosphere and lower thermospheres to exhibit significant asymmetries. These asymmetries may be attributable to hemispheric differences in dynamical forcing due to one or more of the following: insolation absorption by ozone, other mesospheric heat sources such as exothermic chemical reactions, tropospheric forcing of vertically or obliquely propagating gravity waves which engage in mesospheric mean-flow interactions, and dissipation of planetary waves which find ducting channels through the middle atmosphere. Interannual variability is also examined in the Molodezhnaya and Heiss I. data, which cover the periods 1967-1986 and 1968-1985, respectively. Accompanying significant year-to-year variability, eastward winds at 95 km over the Antarctic (Molodezhnaya Station) exhibit a trend of decreasing amplitude from 1968 to 1977 that is not reflected in the arctic data (Heiss I.). The annual mean winds at Molodezhnaya remained at the 4-8 m/s level from 1977 to 1986. (Auth. mod.)

I-48177

Portniagin, I.U.I., **Dynamics of the antarctic and arctic mesosphere and the lower thermosphere regions, II. The semidiurnal tide**, *Journal of atmospheric and terrestrial physics*, May 1993 p.843-855, 13 refs.

The semidiurnal tidal dynamics of the antarctic and arctic mesopause regions (95 +/- 15 km) are investigated through comparative analyses of monthly mean tidal wind fields determined from radar measurements at Scott Base, Molodezhnaya, and Mawson stations in the Antarctic, and the near-conjugate stations of Heiss I. and Poker Flat in the arctic region. The main feature common to all stations is the fall equinoctial maximum in amplitude (10-20 m/s), which is also reproduced by the most recent numerical tidal model. However, the wintertime amplitude growth with height and the shorter vertical wavelengths characterizing the model are features not reflected in the data. There is also a spring equinoctial maximum in the antarctic data which the model does not reproduce. The mean zonal wind maintains some degree of year-to-year variability superimposed on apparent long-term decreases of order 0.3-0.5 m/s in the Southern Hemisphere semidiurnal tidal amplitudes. Numerical simulations presented herein indicate that changes of this magnitude cannot even be induced (via mode coupling) by a change in the mean zonal wind field of order 30%, and are more plausibly explained by a secular change in the tidal forcing by ozone insolation absorption. However, in contrast to Part I, the annual mean tidal amplitude is not characterized by any significant secular trend, remaining at about 10.0 m/s throughout the 1970-1986 period. (Auth. mod.)

I-48182

Yamazaki, K., **Moisture budget in the antarctic atmosphere**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.36-45, 8 refs.

Climatologies of moisture flux, its convergence and accumulation rate for the antarctic region are derived from the 5-year (1986-1990) twice-daily U.S. NMC (National Meteorological Center) objective analysis data. Over the southern ocean, eastward moisture flux is dominant, while westward flux exists along the antarctic coastline. The annual mean moisture flux convergence (accumulation rate) is positive along the coastline; the maximum of 3 mm/day is found on the west coast of the Antarctic Peninsula, while it is small inland. The estimated annual accumulation over Antarctica is 135 +/- 18 mm. As for the seasonal variation, the accumulation is large in winter along the coast and over Antarctica as a whole, while it is large in summer in the inland elevated region. (Auth.)

I-48183

Shibata, S., Morimoto, M., **Results of ozonesonde observations at Syowa Station in 1990**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.46-52, 6 refs.

Ozonesonde observations carried out at Showa Station in 1990 revealed that the ozone continued to decrease rapidly from Aug. to Oct. and was destroyed almost completely, between 80 and 100 mb, during the first 10 days of Oct. The monthly mean of total ozone amount was the lowest ever observed at Showa Station in Aug. and Sep. The severe ozone depletion in 1990 was close to that of 1987 and 1989. Polar stratospheric clouds (PSCs) were observed at Showa Station in winter; their height was estimated from the angle between bright PSC edges and the sun to be between 15 and 20 km. When the PSCs appeared an extreme cold region (below -83 C) where type 2 PSCs occur was observed by stratospheric soundings. (Auth. mod.)

I-48184

Miyauchi, M., Ohkawara, N., **On the vertical profiles of long wave radiation at Syowa Station in Antarctica**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.53-70, 16 refs.

Vertical profiles of long wave radiation were obtained, with 6 radiometersonde types which are basically the same, at Showa Station from 1966 to 1988. Data are analyzed for cloudless, overcast and all other conditions. The downward fluxes show good agreement with each other on average, but there are discrepancies in the upward flux. It can be inferred that the discrepancies might be caused by setting the ground surface temperature equal to the surface air temperature in calculation, and by the temperature change of the ground surface over the area that the radiometersonde observed. The upward fluxes at the 100 mb and 850 mb levels, and the downward fluxes at those levels in each month, as well as the budgets of radiative flux in the atmosphere and at the ground surface for all three conditions, are discussed. (Auth. mod.)

I-48212

Deshler, T., **Ozone depletion and denitrification in the antarctic stratosphere in austral spring 1990**, *Antarctic journal of the United States*, 1991 26(5), p.242-244, 8 refs.

In 1990, the balloonborne measurement campaign at McMurdo Station began on Aug. 25 and continued until Nov. 3. During this period, 40 ozone and temperature profiles extending to approximately 32 km were measured. Instruments were also included on 6 flights to measure polar stratospheric clouds, two flights to measure condensation nuclei, and two flights to measure water vapor. Although 1987, 1989, and 1990 were similar in the amount of ozone destroyed, the altitude of maximum depletion decreased from 16.5 to 15 km. In each of these years, the altitude of maximum depletion corresponds directly with the altitude of the minimum temperature. Although similar temperature profiles were observed in 1989 and 1986, ozone depletion was nearly twice as great in 1989 compared with 1986. The coldest Oct. was 1987, although 1990 had similar temperatures; however, the Oct. average ozone-mixing ratio reached its lowest value in 1990, thus replacing 1987 as the worst year of record.

I-48213

Rosen, J.M., Kjome, N.T., Oltmans, S.J., **Study of polar stratospheric clouds at the South Pole**, *Antarctic journal of the United States*, 1991 26(5), p.244-245, 5 refs.

This paper describes research performed during austral winter 1990, taking balloonborne measurements of polar stratospheric clouds and frost point in the nighttime stratosphere over Amundsen-Scott Station. A newly developed balloonborne instrument, a backscatter-

sonde, was used to obtain the polar stratospheric cloud profiles. The data product generated by the backscattersonde is similar to that produced by lidar systems. A balloonborne frost-point sensor with a successful record in the Arctic and Antarctic also was used in this project. Preliminary results with the frost-point sensor showed that the entire troposphere and stratosphere inside the vortex become saturated as the atmosphere gradually cools. From combined frost-point and backscattersonde results, it can be deduced that continued cooling in winter causes not only extensive polar stratospheric cloud formation but also significant dehydration and denitrification in the stratosphere.

I-48214

Collins, R.L., Senft, D.C., Gardner, C.S., Sliter, R.W., **Lidar measurements of the middle atmosphere at South Pole**, *Antarctic journal of the United States*, 1991 26(5), p.245-247, 5 refs.

In this article, the authors present lidar measurements of polar stratospheric clouds and mesospheric sodium profiles made on June 25, 1990 at the Amundsen-Scott Station. The total integrated photo-count profile shows enhanced scattering from polar stratospheric clouds between 15 and 25 km. Molecular scattering decays with altitude up to 65 km. Resonant scattering from the sodium layer is evident from 75 to 110 km. The fine vertical structure evident on June 25 is typical of that observed throughout the austral winter until Sep. Little change in this vertical structure can be seen over the 14-hour observation period, indicating that the clouds, as they are moved overhead by advection, cover a wide horizontal expanse. By mid-Sep., with the return of sunlight to the antarctic stratosphere and rising temperatures, the polar stratospheric clouds dissipated. Thin, broken polar stratospheric clouds were observed until mid-Oct.

I-48215

Stearns, C.R., Weidner, G.A., **Antarctic automatic weather stations: austral summer 1990-1991**, *Antarctic journal of the United States*, 1991 26(5), p.247-250, 9 refs.

The National Science Foundation's Division of Polar Programs places automatic weather station units in remote areas of Antarctica in support of meteorological research and operations. The automatic weather station data are collected by the ARGOS Data Collection System on board the National Oceanic and Atmospheric Administration series of polar-orbiting satellites. The history of the automatic weather station locations in Antarctica for 1990-1991 is given. The basic unit measures air temperature, wind speed, and wind direction at a nominal height of 3 m above the surface and air pressure at the electronics enclosure. Some units measure relative humidity at 3 m and the air temperature difference between 3 m and 0.5 m above the surface at the time of installation. One unit is equipped to measure 8 levels of snow temperature. The automatic weather station units are located in arrays for meteorological experiments and operational support. Some of the areas supported are listed.

I-48216

Stearns, C.R., Weidner, G.A., **Wind speed, wind direction, and air temperature at Pegasus North during 1990**, *Antarctic journal of the United States*, 1991 26(5), p.251-253, 2 refs.

The automatic weather station unit at Pegasus North measures wind speed, wind direction, air temperature, and relative humidity at a nominal height of 3 m. Air pressure is measured at the electronics enclosure. The vertical air temperature difference is measured between 3.0 and 0.50 m. Estimates of the sensible and latent heat fluxes to the air can be made using the wind speed, vertical air-temperature difference, and the relative humidity. Results are presented in tables.

I-48217

Liu, Z., Geer, J.K., Bromwich, D.H., **Boundary-layer study near Ross Island using acoustic remote sensing**, *Antarctic journal of the United States*, 1991 26(5), p.254-256, 8 refs.

During the 1990 campaign, the authors used a sodar at Williams Field, near the southwestern tip of Ross I., which is strongly influenced by the surrounding complex topography and by the mesoscale and synoptic-scale pressure systems. The main purposes of the campaign were to test out the sodar in the harsh antarctic environment and to gain further understanding of the characteristics and evolution of the boundary layer in such a complex setting. The 1990 campaign lasted from Oct. 19 to Nov. 5, during which period a significant diurnal variation of the boundary layer under the influence of insolation was noted. The sodar deployment at Williams Field was successful, and it proved to be an effective tool for probing the behavior of the stable planetary layer.

I-48218

Bowers, W.D., Chuan, R.L., Kyle, P.R., **Real-time, *in situ* measurement of hydrogen chloride and sulfur dioxide in the plume of Mount Erebus**, *Antarctic journal of the United States*, 1991 26(5), p.256-258, 9 refs.

Real-time *in situ* measurements of hydrogen chloride and sulfur dioxide gases in the Mount Erebus plume were made using a modified quartz crystal microbalance cascade impactor. The instrument was modified to be able to use the first three stages to collect aerosols; the last stage contained the coated crystal. The measurements were taken on Jan. 16, 1991 on the rim of Mount Erebus as the plume drifted over the side of the rim. The sensor was exposed to the plume for a period, then a charcoal filter was placed on the inlet to remove the chemical vapors and purge the crystal with pure air so the sulfur dioxide could diffuse out of the TEA. By comparing the signal traces with the calibration curves, the concentration of sulfur dioxide and hydrogen chloride were determined to be 0.2 and 1.1 ppm, respectively.

I-48219

Carrasco, J.F., Bromwich, D.H., **Case study of katabatic wind-forced mesoscale cyclogenesis near Byrd Glacier**, *Antarctic journal of the United States*, 1991 26(5), p.258-261, 6 refs.

On the premise that the western side of the Ross Ice Shelf is a cyclogenetic area linked with katabatic airflows from East Antarctica, this article presents an example of mesoscale cyclogenesis that took place in this area during Feb. 1988. Automatic weather station data, surface and 500 hectopascal synoptic analyses provided by the Australian Bureau of Meteorology, and satellite information were used to study this case. It is concluded that the probable establishment of a boundary layer baroclinic zone, induced by katabatic winds and a subsynoptic trough along the Transantarctic Mountains, created sufficient conditions for the formation of a mesoscale cyclone near Byrd Glacier around 0900 universal coordinated time on Feb. 17, 1988.

I-48220

Bromwich, D.H., Du, Y., **Numerical simulation of the katabatic winds over West Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.261-264, 9 refs.

To understand more completely the dynamics of antarctic surface winds, a detailed study of surface airflow over West Antarctica is being conducted. Emphasis is placed on that part of Marie Byrd Land upslope from Siple Coast where, in contrast to most parts of Antarctica, terrain slopes are steeper in the interior than adjacent to the coast. Preliminary results of numerical modeling of airflow over West Antarctica are presented.

I-48221

Parish, T.R., Bromwich, D.H., **Automatic weather station observations of strong katabatic winds near Terra Nova Bay, Antarctica**, *Antarctic journal of the United States*, 1991 26(5), p.265-267, 4 refs.

Currently underway is an observational study of the intense katabatic winds found near Terra Nova Bay. Six automatic weather stations have been installed along Reeves Glacier and upslope from the glacier on the plateau. In addition, an array of 4 automatic weather stations near Terra Nova Bay has been deployed by the Italian Antarctic Expedition. Here the focus is on data collected by automatic weather station units 8905 and 8909, which are situated beyond the foot and near the head of Reeves Glacier, respectively. Composite depictions of the annual course of state parameters for the entire automatic weather station array have been prepared for the calendar year 1988. The trends were computed by first determining daily averages (vector averages for wind) and then passing the time series through a nine-point low-pass filter to remove much of the high-frequency variance. A figure shows the evolution of potential temperature and wind speed during the course of 1988 for units 8905 (Inexpressible I.) and 8909 (head of Reeves Glacier). There is a pronounced decrease of potential temperature during Feb. (days 32-60). The rapid change is, in all likelihood, a result of the rapidly changing solar geometry and resulting decrease in insolation.

I-48222

Bromwich, D.H., Geer, J.K., **Satellite analyses of katabatic winds near Terra Nova Bay**, *Antarctic journal of the United States*, 1991 26(5), p.268-271, 8 refs.

All available NOAA-AVHRR (National Oceanic and Atmospheric Administration-Advanced Very-High-Resolution Radiometer) satellite images at thermal infrared wavelengths, images that were collected at McMurdo Station between July and Sep. in 1988 and 1989, were reviewed to describe the range of behavior exhibited by the surface winds near Terra Nova Bay. A representative set of examples is presented here. Winter thermal infrared satellite images of this area exhibit prominent warm signatures of surface winds, probably as a result of vigorous vertical mixing in stably stratified air masses due to strong low-level winds. Fairly uniform fluctuations of the katabatic winds throughout the Terra Nova Bay region have been inferred from the automatic weather station records. The changes, shown in figures, are consistent with this finding.

I-48224

Walden, V.P., Murcray, F.J., Heuberger, R., **Atmospheric longwave radiation spectra**, *Antarctic journal of the United States*, 1991 26(5), p.275-276, 2 refs.

A study of the spectrum of thermal infrared radiation from the antarctic atmosphere is reported. During the 1990-1991 austral summer field season at Amundsen-Scott Station, an interferometer and a pyrgeometer were operated on the top of Skylab for about 2 months. A figure, which is a typical clear sky spectrum taken on Dec. 11, 1991, shows the contributions of carbon dioxide, ozone, water vapor, and methane. The atmospheric window region is visible from about 8 to 13 microns. The broadband flux measured by the pyrgeometer on clear days was about 125 watts/sq m. Another figure shown is the spectrum from an overcast sky on Jan. 9, 1991, together with two blackbody curves, showing that the brightness temperature of the cloud base is about 245 K. Together with information about the temperature structure of the atmosphere and the cloud base height, the authors determined the cloud emissivity (or optical thickness). The pyrgeometer measured 210 watts/sq m at this time.

I-48226

Murcray, F.J., Heuberger, R., **Year-round measurement of atmospheric infrared emission at the South Pole**, *Antarctic journal of the United States*, 1991 26(5), p.278-281.

The spectral distribution of the atmospheric emission in the infrared was measured at Amundsen-Scott Station during the period from Dec. 1989 to Jan. 1991. The data obtained by a Michelson interferometer, located on the roof of Skylab, include the column densities for water, carbon dioxide, ozone, fluorocarbon-11, fluorocarbon-12, and nitric acid in the wavenumber region ranging from 500/cm to 1,500/cm. Monitoring these components during the austral winter gives important information about the change in concentration during the long absence of sunlight, contributing to the knowledge of the chemistry that influences the depletion of the ozone layer. The measurements are fully automated and require a minimum of attention. The two outside blackbodies as well as an inside reference blackbody are used for calibration. This allows the data analyzer to obtain the absolute radiance emitted by the atmosphere and its spectral distribution. Experience showed that not enough measurements are taken under favorable conditions if they are taken at fixed time intervals.

I-48227

Wendler, G., Prichard, D., **Temperature increase observed in Adélie Land, East Antarctica?**, *Antarctic journal of the United States*, 1991 26(5), p.281-284, 5 refs.

The outgoing longwave radiation for Mer Dumont d'Urville (off-shore area between 120 and 150E and between 62.5 and 67.5S) was calculated. An offshore area was chosen because the temperature is more uniform there than in coastal areas of Antarctica, where altitude differences cause greater variations in surface temperature. A large annual variation can be observed with maxima close to 200 watts/sq m in summer, while in winter values drop to 170 watts/sq m. Year-to-year differences occur, but because the annual cycle is so strong, trends are difficult to detect. In a figure shown, the authors plotted the deviation series obtained by deducting the mean annual curve from the time series. Linear regression of these data points shows an increase of 1.8 watts/sq m, or about 1% of the radiative flux over 15 years. This regression line is significant at the 95% level. Converting this radiation trend into a temperature change, an increase of 0.6 C would occur over this area, as seen from space, during the last 15 years. If this trend were to continue, it would result in a temperature increase of about 4 deg per century.

I-48245

Smith, V.R., **Surface air temperatures at Marion Island, sub-antarctic**, *South African journal of science*, Nov./Dec. 1992 88(11/12), p.575-578, 10 refs.

Annual mean surface air temperatures at Marion I. remained relatively constant from 1949 until the late 1960s and have increased considerably since then. The average increase between 1970 and 1991, calculated by linear regression, has been 0.04 C per year, and 16 of the 22 years since 1969 have been warmer than the long-term (1949-1991) average. Warming has occurred for all months except June, but the late winter to midsummer months account for 82% of the increase in mean annual values. Evidence is presented that a newly erected powershack is influencing temperature measurements on the island. (Auth.)

I-48249

Williams, L.R., Golden, D.M., **Heterogeneous reactions on sulfuric acid surfaces**, Conference on Atmospheric Chemistry, Anaheim, CA, Jan. 17-22, 1993, Boston, American Meteorological Society, 1993, p.122-126, 29 refs.

The importance of heterogeneous processes in the chemical balance of the stratosphere has been dramatically illustrated by the annual appearance of the ozone hole during the antarctic spring. Heterogeneous reactions on particle surfaces in the polar stratospheric clouds convert chlorine reservoir molecules into easily photolyzed active chlorine species which lead to ozone destruction. In addition, heterogeneous reactions remove odd nitrogen which would normally sequester active chlorine in stable reservoir molecules. There is now

increasing evidence that similar heterogeneous chemistry on the background stratospheric sulfate aerosol may be contributing to global ozone depletion. The following 4 reactions are considered to be key contributors to the antarctic ozone hole: $\text{ClONO}_2 + \text{H}_2\text{O}$ yields $\text{HOCl} + \text{HNO}_3$; $\text{N}_2\text{O}_5 + \text{H}_2\text{O}$ yields 2 HNO_3 ; $\text{ClONO}_2 + \text{HCl}$ yields $\text{Cl}_2 + \text{HNO}_3$; $\text{N}_2\text{O}_5 + \text{HCl}$ yields $\text{ClNO}_2 + \text{HNO}_3$. All 4 reactions occur efficiently on water ice and nitric acid trihydrate, the materials believed to make up polar stratospheric clouds (PSCs). Laboratory results on the rates of heterogeneous reactions on sulfuric acid surfaces indicate that of the 4 reactions implicated in the antarctic ozone hole, only the second appears to be fast enough on sulfuric acid to affect the partitioning of nitrogen species and thus the ozone concentration. (Auth. mod.)

I-48259

Cattle, H., Murphy, J.M., Senior, C.A., **Response of antarctic climate in general circulation model experiments with transiently increasing carbon dioxide concentrations**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.209-218, 27 refs.

DLC QH301.R648a

Processes in the southern ocean around Antarctica are important for determining the global pattern of transient temperature change as CO_2 increases. This is illustrated by results from two experiments. First, an experiment with a high resolution (2.5 deg x 3.75 deg) atmospheric model coupled to a simple slab ocean in which the response of climate to an instantaneous doubling of greenhouse gas concentrations was examined, and this showed the largest induced warming to be in the polar regions in winter, similarly to the results of previous experiments carried out at the Meteorological Office and elsewhere. However, an experiment with a deep ocean model and a (more realistic) 1% per annum increase in greenhouse gas concentrations shows the pattern of global warming to be shifted to give minimum values around Antarctica as a result of deep oceanic mixing processes in the southern ocean, consistent with similar experiments carried out at other centers. (Auth. mod.)

I-48260

Pyle, J.A., **Ozone loss in Antarctica: the implications for global change**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.219-226, Refs. p.225-226.

DLC QH301.R648a

Although stratospheric ozone loss had been predicted for many years, the discovery of the antarctic ozone hole was a surprise which necessitated major rethinking in theories of stratospheric chemistry. The new ideas advanced are discussed here. Global ozone loss has now also been reported after careful analysis of satellite and ground-based data sets. The possible causes of this loss are considered. Further advances require a careful coordination of field measurements and large-scale numerical modeling. (Auth.)

I-48265

Barker, P.F., **Sedimentary record of antarctic climate change**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.259-267, Refs. p.265-267.

DLC QH301.R648a

Circum-Antarctic marine sediments contain a record of past climate and southern ocean circulation that both complements and considerably extends the record in the continental ice. Variations in primary biological production, reflecting changes in sea-ice cover and sea surface temperature, in bottom current strength and the size of the grounded continental ice sheet, all contribute to changes in sediment characteristics, in a record extending back many million years. It is possible to assess both the value of the proxy record in antarctic sediments, and the validity of the analog approach to understanding climate change, by focusing on the last glacial cycle and, for compari-

son, on earlier periods that were significantly different: the Pliocene before 3 Ma that could provide an analog for global warming, and the Oligocene before there was an Antarctic Circumpolar Current. (Auth.)

I-48276

Pétre, P., Andre, J.C., **Katabatic winds of Adélie Coast. The IAGO project results** [Les vents catabatiques en Terre-Adélie. Résultats de l'expérience IAGO], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.41-46, In French.

After reviewing data obtained in the 1950-1952 French expedition to Port-Martin, 62 km west of Cape Denison, the authors describe atmospheric processes involved in the development of katabatic winds. From the French-American project IAGO, carried out at Dumont d'Urville Station in 1985-1986, results of more current observations of katabatic wind dynamics, the effects on climate and dangers to air operations, are discussed.

I-48277

Aimédu, P., **Stratospheric ozone on Adélie Coast** [L'ozone stratosphérique en Terre-Adélie], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.47-49, In French.

Studies of stratospheric ozone carried out at Dumont d'Urville Station since 1986 are discussed. Methods of analysis of data obtained by a spectrometer (SAOZ) a lidar and an ozonsonde, installed at the Station in 1988-1989, are described. In comparing the SAOZ data with satellite (TOMS) data, it was found that TOMS indicated much lower ozone values than those obtained from SAOZ; an interpretation for this difference is proposed.

I-48278

Polian, G., **Atmospheric physics and chemistry of Adélie Coast** [La physico-chimie de l'atmosphère en Terre-Adélie], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.50-59, In French with English summary. 13 refs.

Several physico-chemical atmospheric processes of great importance for the Southern Hemisphere as well as the whole planet, occurring in the antarctic area, were studied. Lead 210, a long lived decay product of radon 222, has been continuously recorded at Dumont d'Urville Station since the early 60s, providing information on a possible recent alteration of the antarctic atmospheric general advective pattern (possibly related to the ozone hole). The same isotope, measured in the superficial firn layers, has yielded dating and accumulation rates of snow during the last 100 years. By means of comparison with strontium 90 data measured in the firn, washout factor and dry deposition rates have been calculated. (Auth. mod.)

I-48284

Prothero, D.R., ed, Berggren, W.A., ed, **Eocene-Oligocene climatic and biotic evolution**, Princeton, N.J., Princeton University Press, 1992, 568p., Refs. passim. For selected papers see E-48285 through E-48289 or 47-3166.

DLC QE737.E53

Five papers, included in the second chapter of this book, deal with Eocene-Oligocene climatic events in the southern ocean. Late Paleogene ice sheets, deep-water history, antarctic glaciation, and faunal and floral turnover are discussed.

I-48292

Péttre, P., Payan, C., Périard, C., **Forecasting of katabatic winds at Dumont d'Urville Station** [Le climat de Dumont d'Urville et la prévision des vents catabatiques], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.23-27, In French.

The atmospheric processes contributing to the development of katabatic winds are described. Annual and diurnal variations of wind speed and intensity at Dumont d'Urville Station are discussed and shown in a figure. Atmospheric pressure and direction are considered the most important factors in the forecast of violent katabatic episodes at the Station.

I-48293

Pommereau, J.P., **French research on polar ozone** [Recherches françaises sur l'ozone polaire], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.28-35, In French.

Data from daily measurements of ozone and NO₂, carried out at Dumont d'Urville Station for over 3 years, are discussed. A figure is presented showing the variations of total ozone during 1989 and the difference between satellite (TOMS) and spectrometer (SAOZ) data, the former showing significantly lower total column ozone than the latter. Daily variations of NO₂ are also illustrated.

I-48303

Hanson, D.R., **Uptake of HNO₃ onto ice, NAT, and frozen sulfuric acid**, *Geophysical research letters*, Oct. 23, 1992 19(20), p.2063-2066, 15 refs.

The uptake of HNO₃ onto ice, HNO₃-H₂O layers, and solid H₂SO₄/H₂O solutions was studied in a cylindrical flow tube in conjunction with a chemical ionization mass spectrometer detection system. An efficient loss of HNO₃ from the gas-phase to these surfaces was observed, and the uptake coefficient was <0.3. The HNO₃-H₂O layers formed, however, had HNO₃ vapor pressures significantly in excess of the expected values for NAT (nitric acid trihydrate). Supersaturations in HNO₃ of factors from three to ten were observed, suggesting a hindrance to the formation of NAT. These results imply that the condensation temperatures of Type I polar stratospheric clouds are 2-3 K colder than that expected for NAT. (Auth. mod.)

I-48304

Syvorotkin, V.L., Sadovskii, N.A., **Rifting, ozone layer and the level of the world ocean** [Riftogenez, ozonovyi sloi i uroven' Mirovogo okeana], *Rossiiskaia akademiia nauk. Doklady*, 1992 323(4), p.731-733, In Russian. 13 refs.

Ozone holes appear as the result of endogenic activity of the Earth. Their appearance in the stratosphere in the mid-1980s was probably related to the unusual increase of solar activity which occurred at the end of the century and coincided with an entire series of natural cataclysms (earthquakes, volcanic eruptions, epidemics). Increased solar activity in some manner causes an increase in the flow of endogenic reduced gases, which contribute to the deterioration of the ozone layer. Data from American researchers show an increase in the concentration of hydrogen in the atmosphere since the mid-1980s, which coincides with the appearance of the ozone hole above Antarctica. (Auth. mod.)

I-48309

Wada, M., Konishi, H., **Study of precipitation in the coastal area of Antarctica as observed at Syowa Station using a vertical pointing radar**, *Antarctic record*, Nov. 1992 36(3), p.341-349, 17 refs.

A new vertical pointing radar was installed at Showa Station in 1988 for observing precipitation and clouds in the Antarctic Climate

Research project begun in 1987. The precipitation in 1988 was approximately half that of 1989. The total precipitation was estimated at about 200 mm from Feb. 23, 1988 to Feb. 22, 1989, and about 390 mm from Feb. 1, 1989 to Nov. 30, 1989. The trend of light snow accumulation in 1988 can be seen in the year-to-year data of the maximum snow depth, measured on the sea ice near Showa Station, and in the annual data of snow accumulation on the coast near Showa Station. (Auth. mod.)

I-48310

Fujii, R., Ono, K., Ohta, S., **Data transfer system using a multi-ID ARGOS transmitter for the antarctic Polar Patrol Balloon experiment**, *Antarctic record*, Nov. 1992 36(3), p.350-362, In Japanese with English summary. 4 refs.

The newly developed multi-ID ARGOS data transfer system for the Polar Patrol Balloon experiment (1990-1993) is described. This system on board the PPBs, with a main processor, continuously transferred data of about 2 kByte/h with great reliability during the entire observation period (longer than one month). This brief report describes the principle and specifications of the system. (Auth.)

I-48345

Marchant, D.R., **Pliocene paleoclimate and east antarctic ice-sheet history from surficial ash deposits**, *Science*, Apr. 30, 1993 260(5108), p.667-670, 33 refs.

The preservation, age, and stratigraphic relation of an *in situ* ashfall layer with an underlying desert pavement in Arena Valley, southern Victoria Land, indicate that a cold-desert climate has persisted in Arena Valley during the past 4.3 million years. These data indicate that the present east antarctic ice sheet has endured for this time and that average temperatures during the Pliocene in Arena Valley were no greater than 3 C above present values. One implication is that the collapse of the east antarctic ice sheet due to greenhouse warming is unlikely, even if global atmospheric temperatures rise to levels last experienced during mid-Pliocene times. (Auth.)

I-48346

Waters, J.W., **Stratospheric ClO and ozone from the Microwave Limb Sounder on the upper atmosphere research satellite**, *Nature*, Apr. 15, 1993 362(6421), p.597-602, 52 refs.

Concentrations of atmospheric ozone and of ClO (the predominant form of reactive chlorine responsible for stratospheric ozone depletion) are reported for both the arctic and antarctic winters of the past 18 months. Chlorine in the lower stratosphere was almost completely converted to chemically reactive forms in both the northern and southern polar winter vortices. This occurred in the south long before the development of the antarctic ozone hole, suggesting that ozone loss can be masked by influx of ozone-rich air. (Auth.)

I-48348

Solomon, S., Sanders, R.W., Garcia, R.R., Keys, J.G., **Increased chlorine dioxide over Antarctica caused by volcanic aerosols from Mount Pinatubo**, *Nature*, May 20, 1993 363(6426), p.245-248, 21 refs.

The annual springtime depletion of antarctic ozone has been shown to be due to the action of chlorine species, activated by reactions occurring on the surfaces of polar stratospheric clouds (PSCs). Similar reactions may also take place on the surfaces of liquid sulphuric acid aerosols when the temperature is too high to permit the formation of PSCs. Such processes may have been facilitated following the eruption of Mount Pinatubo in June 1991, when unprecedented amounts of sulphur compounds were injected into the stratosphere. Presented here are observations of antarctic chlorine dioxide abundances in the austral autumn and winter of 1991 and 1992. In 1992,

unlike 1991, chlorine dioxide levels increased dramatically in the autumn, when PSCs were extremely unlikely to have been present. Model results suggest that this was mainly caused by the direct activation of chlorine nitrate on the aerosol surfaces. The effect of the Pinatubo aerosols probably contributed to the unprecedented depth and areal extent of antarctic ozone depletion in 1992. (Auth. mod.)

I-48350

Roscoe, H.K., Hind, A.K., **Equilibrium constant of NO₂ with N₂O₄ and the temperature dependence of the visible spectrum of NO₂: a critical review and implications for measurements of NO₂ in the polar stratosphere**, *Journal of atmospheric chemistry*, Apr. 1993 16(3), p.257-276, 38 refs.

Measurements of stratospheric NO₂ by ground-based visible spectrometers rely on laboratory measurements of absorption cross-sections. Here are reviewed low-temperature laboratory measurements, which disagree by amounts claimed to be significant. Recalculation of their errors shows that in general disagreements are not significant and that errors in the ratios of cross-sections at low to room temperature are between $\pm 3\%$ and $\pm 8.8\%$. Of these errors, up to $\pm 3.5\%$ was contributed by errors in the equilibrium constant in those measurements where the pressure was above 0.1 mbar. Extrapolation of these cross-sections to analysis of measurements of NO₂ at the low temperatures of the arctic and antarctic stratosphere is dubious. For satisfactory analysis of polar spectra, the NO₂ cross-sections should be measured at temperatures down to 190 K with a relative accuracy of $\pm 1\%$. (Auth. mod.)

I-48352

Chapman, W.L., Walsh, J.E., **Recent variations of sea ice and air temperature in high latitudes**, *American Meteorological Society. Bulletin*, Jan. 1993 74(1), p.33-47, 27 refs.

Feedbacks resulting from the retreat of sea ice and snow contribute to the polar amplification of the greenhouse warming projected by global climate models. A gridded sea-ice database, for which the record length is now approaching four decades for the Arctic and two decades for the Antarctic, is summarized here. The sea-ice fluctuations derived from the dataset are characterized by temporal scales of several seasons to several years, and spatial scales of 30-180 deg of longitude. The ice data are examined in conjunction with air temperature data for evidence of recent climate change in the polar regions. There is no significant trend of ice extent in the Arctic during winter or in the Antarctic during any season. The seasonal and geographical changes of sea-ice coverage are consistent with the more recent greenhouse experiments performed with coupled atmosphere-ocean models. (Auth. mod.)

I-48374

Gruzdev, A.N., Sitnov, S.A., **Tropospheric ozone annual variation and possible troposphere-stratosphere coupling in the Arctic and Antarctic as derived from ozone soundings at Resolute and Amundsen-Scott stations**, *Tellus*, Apr. 1993 45B(2), p.89-98, 19 refs.

The tropospheric ozone annual variation in the northern and southern polar regions is analyzed from ozone sounding data obtained at Resolute Station during a 15-year period (1974-1988) and Amundsen-Scott Station during a 7-year period (1967-1971, 1986-1987). Tropospheric ozone is always less abundant in the southern than in the northern polar region. The difference is greatest in spring in the tropopause layer, where the arctic ozone mixing ratio can be 5 times the mixing ratio in Antarctica. The phase of ozone annual variation above Resolute changes (increases) gradually from the stratosphere across the tropopause to the middle troposphere. Unlike this, the

phase of the antarctic ozone annual harmonic has a discontinuity in the layer of the changing tropopause level, so that the annual harmonic in the upper troposphere, lower stratosphere is 4 to 5 months out of phase (earlier) with that above and beneath. Above both the arctic and antarctic stations, the ozone mixing ratio and its vertical gradient evolve in a similar manner in the wide layer from the lower stratosphere to the middle troposphere. Correlation analysis gives no ozone-tropopause correlation in the Antarctic in winter, while in the Arctic there are negative correlation peaks just above the tropopause during all seasons. (Auth. mod.)

I-48375

Gruzdev, A.N., Elokho, A.S., Makarov, O.V., Mokhov, I.I., **Some recent results of Russian measurements of surface ozone in Antarctica. A meteorological interpretation**, *Tellus*, Apr. 1993 45B(2), p.99-105, 26 refs.

Surface ozone measurements were carried out at Molodezhnaya and Mirnyy stations in spring 1987-autumn 1988 with a Dasibi 1008-AH ozone analyzer. The data show an annual variation with a summer minimum 15 ppbv. The striking features of the surface ozone record are two types of day-to-day variability. One is characterized by day-to-day variations of about 10 ppbv magnitude; the likely mechanism of such variations is the vertical transport induced by cyclonic activity. The other type occurs in synoptically quiet periods (frequent in summer), when the day-to-day ozone variations are less significant; the most likely mechanism of these variations is the slope katabatic wind which transports ozone inside the antarctic continent. The latitudinal distribution of surface ozone for this period, measured aboard an aircraft, showed a slight increase towards Vostok Station. (Auth.)

I-48376

Taalas, P., **Vertical distribution of tropospheric ozone in Antarctica and in the European Arctic**, *Tellus*, Apr. 1993 45B(2), p.106-119, 26 refs.

A comparison of monthly mean tropospheric ozone profiles was made from ozone soundings performed since 1988 at Marambio Station and at Sodankylä. In midwinter, the difference between the two hemispheres' monthly means is small, < 1 mPa. The general photochemical activation in springtime leads to larger differences: the partial pressures decrease in Antarctica whereas in the Arctic, pronounced production of ozone is seen. In spring and summer the hemispheric differences are about 3 mPa. Exceptionally high and low partial pressures at Sodankylä and Marambio have been studied using 3-dimensional trajectories based on the ECMWF analyses. Episodes of upper tropospheric ozone loss at Marambio have been observed during the stratospheric ozone depletion period in spring. The only cause for especially high tropospheric ozone concentrations in Antarctica has been stratospheric intrusions. Low partial pressures in the boundary layer have been connected with advection of marine air masses to Marambio. (Auth. mod.)

I-48377

Sturges, W.T., **Bromoalkane production by antarctic ice algae**, *Tellus*, Apr. 1993 45B(2), p.120-126, 18 refs.

Ice microalgae collected from the underside of annual sea ice in McMurdo Sound were found to contain and release to seawater a number of brominated hydrocarbons. These included bromoform, dibromomethane, mixed bromochloromethanes, and methyl bromide. Atmospheric measurements in the McMurdo Sound vicinity revealed the presence of bromoform and methyl bromide in the lower atmosphere, with lowest concentrations inland, further indicating that biogenic activity in the Sound is a source of organic bromine gases to the antarctic atmosphere. This may have important implications for boundary layer chemistry in Antarctica. In the Arctic, the presence of bromoform has been linked to loss of surface ozone in the spring. The authors report here preliminary evidence for similar surface ozone loss at McMurdo Station. (Auth.)

I-48379

Ohtake, T., **Freezing points of H₂SO₄ aqueous solutions and formation of stratospheric ice clouds**, *Tellus*, Apr. 1993 45B(2), p.138-144, 21 refs.

The freezing temperature of H₂SO₄ aqueous solutions as a function of concentration was experimentally measured in an investigation of the ice nucleation of natural H₂SO₄ mixed aerosols. Based on these measurements, it is suggested that the formation of ice crystals in cirrus and polar stratospheric clouds is the result of the condensation of water vapor and subsequent freezing of natural H₂SO₄ aerosols. (Auth.)

I-48380

Ito, T., **Size distribution of antarctic submicron aerosols**, *Tellus*, Apr. 1993 45B(2), p.145-159, Refs. p.157-159.

The method and results from observation of the size distribution of submicron aerosols carried out at Showa Station in the sunlit months from Aug. to Dec. in 1978 are described. The prevalence of the bimodal size distribution observed at Showa Station in the sunlit months gives evidence of new particle formation in the antarctic troposphere. The most plausible precursors of SO₂ involved in this process seem to be rather inert gases such as COS, CS₂, etc. DMS plays a small role in this new particle formation process, although it does play an important role in maintaining the aerosol mass concentration in the antarctic atmosphere. (Auth. mod.)

I-48381

Yamazaki, K., Chiba, M., **Three-D global simulation of the advective transport of passive tracers from various northern hemisphere sources**, *Tellus*, Apr. 1993 45B(2), p.160-178, 22 refs.

Two-year transport simulations were performed for passive tracers continuously emitted from Japan, Europe, North America and Amazon regions in order to study transport processes of anthropogenic gases such as CO₂ and halocarbons. Three-dimensional wind data produced by the Meteorological Research Institute global spectral model with rhomboidal 24 truncation and 23 levels are used. Globally, there are three regions within which the transport of tracer is relatively rapid. These are the tropics and the northern/southern extratropics. A significant seasonal oscillation in tracer density develops in the antarctic region, with the maximum in early June. In the cases of European and North American sources, an equatorward transport is slow and a poleward transport is enhanced in winter. In all cases, transport to the southern extratropics occurs in the upper troposphere because of upward advection in the tropical region. The tracer density increases with altitude in the troposphere in the southern extratropics except over Antarctica. Over Antarctica, the tracer density decreases with altitude and the horizontal distribution is nearly uniform at the surface, indicating downward transport of low-density stratospheric air. (Auth. mod.)

I-48387

Jonsson, S., **Local climate and mass balance of a blue-ice area in western Dronning Maud Land, Antarctica**, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990 26(1), p.11-29, With German summary. 30 refs.

A detailed study of the glaciological and meteorological characteristics of a small blue-ice area on the downstream side of Heimefrontfjella, western Dronning Maud Land, was initiated in Jan. 1988 and continued during the summer seasons of 1989 and 1990. The study included stake measurements for mass balance and ice velocity, ice thickness measurements, and shallow firn cores for oxygen isotope variations. An automatic weather station at the bottom of the basin registered meteorological data every 3 hours between Jan. 16, 1988 and June 5, 1989. More detailed data were obtained during the 1988 and 1990 field seasons. The local summer climate of the basin was

found to be warmer, less humid and above all more gusty than that of the surrounding ice sheet, and a clear relationship between ablation rate, dominant wind direction and topography was recorded. Mass balance measurements showed a maximum net ablation of 22 cm ice by evaporation for the 1988-1989 balance year but only half as much for the succeeding year. This difference is most likely explained by a much lower accumulation during the first year. Most net ablation seems to take place during summer; more than 25% could take place between Mar. 1 and Oct. 30. Most probably this winter ablation occurs when the strength of the boundary layer air flow passes a certain threshold, thereby destroying the pool of cold stagnant air that is regularly formed in the basin during the winter. This periodic variation was superimposed on a larger-scale periodic variation (30-40 days) of the same parameters. The latter, which also could be detected in pressure and temperature data from the Halley Station, was synoptically forced and amplified by the special topography of the Scharffenberg basin. (Auth. mod.)

I-48388

Fortuin, J.P.F., Oerlemans, J., **Atmospheric model for simulating the mass balance and temperature on the antarctic ice sheet**, *Zeitschrift für Gletscherkunde und Glazialgeologie*, 1990 26(1), p.31-56, With German summary. 40 refs.

An attempt is made to simulate the antarctic climate by modelling the atmospheric circulation along an ice flow line of the East Antarctic ice sheet. The model consists of three atmospheric layers: a boundary layer, the free troposphere and the stratosphere, as well as an ice surface layer. The circulation in the troposphere is driven primarily by the buoyancy forcing in the boundary layer. Temperature, moisture concentration, velocity and boundary layer height are the main prognostic variables, from which surface mass balance along the elevation profile can be calculated. This is done for a parabolic ice sheet profile with and without an ice shelf extension. Erosion or accumulation due to wind-driven snow is also taken into account, but found to be negligible compared to precipitation and evaporation. The resemblance of the model output to annually averaged climatic observations is reasonable, the main discrepancies being depressed precipitation in the interior region and elevated temperatures at the coastal end of the ice sheet profile. The sensitivity of the simulated temperature and mass balance field along the elevation profile is determined for insolation, cloudiness, and meridional -advection and -synoptic pressure gradients. The sensitivity to changes in coastal temperature and in ozone and carbon dioxide concentrations is also presented. (Auth. mod.)

I-48393

Murphy, B.F., Simmonds, I., **Analysis of strong wind events simulated in a GCM near Casey in the Antarctic**, *Monthly weather review*, Feb. 1993 121(2), p.522-534, 24 refs.

Strong wind events occurring near Casey (Antarctica) in a long July general circulation model (GCM) simulation have been studied to determine the relative roles played by the synoptic situation and the katabatic flow in producing these episodes. It has been found that the events are associated with strong katabatic and strong gradient flow operating together. Both components are found to increase three-fold on average for these strong winds, and although the geostrophic flow is the stronger, it rarely produces strong winds without katabatic flow becoming stronger than it is in the mean. The two wind components do not flow in the same direction; indeed, there is some cancellation between them, since katabatic flow acts in a predominantly down-slope direction, while the geostrophic wind acts across slope. The stronger geostrophic flow is associated with higher-than-average pressures over the continent, and the approach of a strong cyclonic system toward the coast and a blocking system downstream. The anomalous synoptic patterns leading up to the occasions display a strong

wavenumber 4 structure. The very strong katabatic flow appears to be related to the production of a supply of cold air inland from Casey by the stronger-than-average surface temperature inversions inland a few days before the strong winds occur. The acceleration of this negatively buoyant air mass down the steep ice-sheet escarpment results in strong katabatic flow near the coast. (Auth. mod.)

I-48411

Sukegawa, Y., Yamanouchi, T., **Meteorological data at Asuka Station, Antarctica in 1991, Japanese Antarctic Research Expedition. JARE data reports**, Mar. 1993 No.190, 101p., 2 refs.

This report contains the surface synoptic data obtained by JARE-32 in 1991. The automatic meteorological observation system was installed at Asuka Station in Jan. 1987. A block diagram is presented of the system. Tables show the following: sensor specifications; monthly and daily meteorological data summaries; surface synoptic data; and hourly global solar radiation, from Jan. through Nov. 1991.

I-48418

Chubachi, S., **Finding of antarctic "ozone hole", Polar news**, Aug. 1991 No.53, p.23-29, In Japanese. 8 refs.

Continuous ozone observations by Dobson spectrophotometer and ozonesonde at Showa Station since 1961, except for interruptions in 1962-1965 and 1974, are summarized. Coinciding with a record low temperature of -45.3 C, a drastic depletion down to 230 Dobson units in total ozone was observed in Sep. 1982 at Showa Station and was subsequently confirmed by observations at the British Halley Station. The "ozone hole" in Antarctica is most pronounced in the local spring, Sep.-Nov. Several graphs are included showing fluctuations in total ozone for 1961-1990.

I-48426

Danilov, A.D., Avdiushin, S.I., **Stratospheric ozone in the Arctic and Antarctic (Review), Geomagnetism and aeronomy**, 1992(Pub. Aug. 92) 32(1), p.1-10, Translated from Geomagnetizm i aeronomiia. 73 refs.

A review is given of works completed during the past 4 to 5 years on the study of ozone in the stratosphere of the Northern and Southern Hemispheres. Main stress is placed on the results of the composite international studies of 1987 and 1989, in which a large amount of information was obtained on the behavior of ozone and other minor components of the atmospheres of the Arctic and Antarctica. The present mechanisms for the formation of the ozone hole in the Antarctic are discussed, and the reasons for its absence in the Arctic are given. (Auth.)

I-48431

Gautier, C., **Multifractal cloud properties data assessment, U.S. Department of Energy. Report**, May 6, 1992 DOE/ER/61062-T1, 15p., DE93 002638, 8 refs.

A number of data sets, analyzed to characterize multifractal cloud properties and to assess the effects of clouds on surface radiation properties (spectral and broadband), include: AVHRR observations of clouds over the ocean, SPOT observations of clouds over the ocean, SSM/1 observations of clouds over the ocean, pyranometer data with all-sky photographs, pyrgeometer data all-sky photographs, and spectral surface irradiance all-sky photographs. A number of radiative transfer computations have been performed to help in the interpretation of these observations or provide theoretical guidance for their analysis. Finally, a number of radiative transfer models have been acquired and tested to prepare for the interpretation of ARM/CART data. (Auth.)

I-48432

Bodhaine, B.A., Harris, J.M., **Aerosol measurements at the South Pole during 1987, U.S. National Oceanic and Atmospheric Administration. Data report**, Nov. 1992 NOAA-DR-ERL-CMDL-9, 122p., PB93-137016, 26 refs.

The Climate Monitoring and Diagnostics Laboratory (CMDL) of the National Oceanic and Atmospheric Administration (NOAA) operates an atmospheric monitoring observatory at Amundsen-Scott Station. The aerosol measurement program provides continuous measurements of condensation nuclei (CN) concentration and aerosol scattering extinction coefficient. During 1987, a special aerosol experiment was conducted that included filter samples for subsequent analysis by the proton induced x-ray emission technique, diffusion battery measurements for size information in the sub-0.1 micron size range, and aerosol absorption measurements using an aethalometer. Surface and upper air meteorological data were also available. The purpose of the report is to present all of the aerosol data obtained during 1987. (Auth.)

I-48456

Xanthakis, J., Poulakos, C., Zerefos, C.S., **Stratospheric ozone variations in the Northern and Southern Hemisphere during the period 1957-1990, Earth, moon, and planets**, Feb. 1993 60(2), p.109-125, 10 refs.

Fluctuations and periodicities of the total atmospheric ozone layer for the period 1957-1990 are studied. Monthly total ozone data from 32 ground-based stations have been analyzed. It is shown that the maxima and the minima of the monthly values of total ozone for each year and for the entire period in question range from Mar. till July and from Sep. till Dec. respectively. Periodicities of 3, 4 and 6 months have been revealed. Finally, the maxima and minima of the total ozone data were examined, and their variations analytically expressed. With the help of an algebraic formula, the observed monthly ozone variations are represented with an accuracy of 97%. (Auth. mod.)

I-48458

Dichter, B.K., Beaubien, A.F., Beaubien, D.J., **Development and characterization of a new solar ultraviolet-B irradiance detector, Journal of atmospheric and oceanic technology**, June 1993 10(3), p.337-344, 11 refs.

Characteristics of an instrument for measuring solar ultraviolet-B irradiance are presented together with a description of the instrument. The instrument measures direct and scattered broadband ultraviolet irradiance (wavelengths between 280 and 330 nm) from the hemisphere of the sky. The measurement technique employs colored glass filters in combination with a fluorescing ultraviolet-sensitive phosphor. Thermal regulation is used to significantly reduce measurement errors introduced by changes in ambient temperature. This instrument can be employed to monitor ozone depletion in Antarctica. (Auth. mod.)

I-48460

Mulvaney, R., Wolff, E.W., **Evidence for winter/spring denitrification of the stratosphere in the nitrate record of antarctic firn cores, Journal of geophysical research**, Mar. 20, 1993 98(D3), p.5213-5220, 34 refs.

A firn core from within the polar vortex in the Weddell Sea sector of Antarctica reveals nitrate peaks that occur in the spring or early summer. Such peaks are less prominent in two other cores from sites that are further north. Although further data are needed, circumstantial evidence suggests that the peak may be due to sedimentation of polar stratospheric clouds from the stratosphere during winter and spring. No change in the form of the peak is seen over the last three decades. It may be possible to observe past stratospheric conditions

over longer time scales from ice cores, but other sources may obliterate the signal in ice from the glacial periods. (Auth. mod.)

I-48467

Bekriaev, R.V., Savchenko, V.G., **Effect of a meridional profile of surfaces on the characteristics of large-scale atmospheric waves** [Vliianie meridional'nogo profil'ia podstilaiushchei poverkhnosti na kharakteristiki krupnomasshtabnykh atmosferynykh voln], *St. Petersburg. Arkticheskii i antarkticheskii nauchno-issledovatel'skii institut. Trudy*, 1992 Vol.430, p.75-86, In Russian. 7 refs.

The effect of a meridional profile of relief on the characteristics of large-scale waves in the atmosphere is investigated, based on an ageostrophic model of atmospheric circulation. An adiabatic linear variant of the model is studied. The role of relief in the formation of climatic characteristics of the northern and southern hemispheres is discussed. (Auth. mod.)

I-48469

Sanders, R.W., **Visible and near-ultraviolet spectroscopy at McMurdo Station, Antarctica. 9. Observations of OCIO from April to October 1991**, *Journal of geophysical research*, Apr. 20, 1993 98(D4), p.7219-7228, 36 refs.

The first spectroscopic measurements of chlorine dioxide throughout antarctic fall, winter, and spring were carried out at McMurdo Station during Apr. to Oct. 1991. Two different observing modes were employed to extend the measurements over the broadest possible seasonal range: direct moon measurements were used as well as observations of the scattered light from the sky at an 80 deg angle relative to the zenith in the direction toward the sun. The latter observing scheme facilitates measurements during the late twilight, when the brightness in the more conventional zenith viewing direction is much weaker. The measurements made using both the scattered light and the lunar sources show that OCIO was below detection limits in late Apr. and May, for a corresponding total ozone loss rate due to the coupling of chlorine and bromine of no more than about 0.25 Dobson Units/day. The observation of OCIO in midwinter implies that the air parcels had been exposed to sunlight, presumably via wave-driven excursions of airflow to latitudes outside the polar night region. High levels of OCIO were measured using moonlight near the full moon phases in late July, Aug., and Sep. Further, these measurements of high OCIO indicate that significant ozone loss should have taken place during midwinter. These data suggest that the winter ozone loss rate is likely to increase in the future as atmospheric loading of chlorine and bromine continues to rise. In addition, scattered light measurements in late July and Aug. revealed very large twilight column abundances then, implying significant ozone loss rates. Somewhat smaller twilight column abundances were measured in Sep., and the OCIO dropped below detection threshold in Oct. (Auth. mod.)

I-48470

Davies, R., **Increased transmission of ultraviolet radiation to the surface due to stratospheric scattering**, *Journal of geophysical research*, Apr. 20, 1993 98(D4), p.7251-7253, 4 refs.

The relative enhancement of ultraviolet radiation reaching the earth's surface due to scattering by stratospheric aerosols is shown to be consistent with single-scattering theory, rather than the photon-trapping effect described by some recent studies. The enhancement is greatest for large solar zenith angles when there is a significant absorbing layer below the stratospheric aerosol. Under appropriate conditions of ozone depletion and the presence of volcanic aerosol, this enhancement makes it possible for the UV flux reaching the surface at high southern latitudes to exceed the peak flux at the equator, but only for wavelengths shorter than about 290 nm. (Auth.)

I-48473

Lu, L.H., Bian, L.G., Jia, P.Q., **Characteristics of radiation during the polar day and night at Zhongshan Station, Antarctica**, *Chinese science bulletin*, Mar. 1993 38(6), p.475-479, 3 refs.

The polar day and night are special phenomena that occur within the antarctic and arctic circles. There is no such phenomenon at Great Wall Station. There are 55 and 58 days at the Zhongshan Station for the polar day and the polar night, respectively. The observational experiments of radiation and thermal regime were carried out at the latter station from Feb. 1990 to Jan. 1991. In the present note the characteristics of the surface radiation are analyzed from the data obtained in the experiment. (Auth.)

I-48478

Markgraf, V., **Paleoenvironments and paleoclimates in Tierra del Fuego and southernmost Patagonia, South America**, *Paleogeography, paleoclimatology, paleoecology*, May 1993 102(1/2), p.53-68, Refs. p.66-68.

A continuous paleoclimatic history for the past 14,000 years is presented based on palynological records from south of latitude 50S in South America. Prior to 12,500 yr B.P. dry *Empetrum* heathlands, not mesic tundra, dominated throughout the high southern latitudes, indicating high winds, annual precipitation of less than 300 mm, and freezing temperatures year-round. After 12,500 yr B.P. steppe replaced the heathlands, suggesting decrease in wind intensity, increase in effective moisture, and increase in temperatures. When forests expanded at 9000 yr B.P. along the rainward side, and at 8000 yr B.P. in the rainshadow side of the Andes, precipitation reached Holocene levels. The high-latitude paleoclimatic history differs from that of lower latitudes as far as the actual amplitude of change and the climatic signal is concerned. Low moisture levels prior to 12,500 yr B.P. between latitudes 45 and 55S suggest that the westerly stormtracks responsible for precipitation patterns in southern South America may have been located year-round closer to the equator than today. The precipitation increase at 12,500 yr B.P. that extended only as far south as 50S indicates that the stormtracks had shifted poleward, but did not reach Tierra del Fuego. By 9000 yr B.P. the stormtracks had shifted to the high southern latitudes, but the large seasonal latitudinal shift comparable to the modern situation did not develop until after 4500 yr B.P. (Auth. mod.)

I-48500

Artaxo, P., **New technique to measure trace elements in individual aerosol particles through scanning proton microprobe**, *Journal of aerosol science*, 1992 Vol.23, Suppl. 1, European Aerosol Conference, 1992. Proceedings, p.S373-S376, 4 refs.

Atmospheric aerosol particles were collected at the Brazilian Antarctic Station and at several biomass burning sites in the Amazon basin tropical rain forest in Brazil. In the antarctic aerosol samples, the sea-salt aerosol particles were clearly predominating, with NaCl and CaSO₄ as major compounds with several trace elements like Al, Si, P, K, Mn, Fe, Ni, Cu, Zn, Br, Sr, and Pb. Factor analysis of the elemental data showed the presence of 4 components: 1) soil dust particles; 2) NaCl particles; 3) CaSO₄ with Sr; 4) Br and Mg. The hierarchical cluster procedure gave results similar to the ones obtained through factor analysis. For the tropical rain forest biomass burning aerosol emissions, biogenic particles with high organic content dominate the particle population, while K, P, Ca, Mg, Zn, and Si are the dominant elements. Zinc at 10 to 200 ppm is present in biogenic particles rich in P and K. A better source resolution was observed with SNM than with bulk PIXE with receptor modeling. The quantitative aspects and excellent detection limits make SNM analysis of individual aerosol particles a powerful analytical tool.

I-48511

Krueger, A.J., Penn, L.M., Scott, C.J., Larko, D.E.,
Nimbus-7 Total Ozone Mapping Spectrometer (TOMS)
antarctic ozone atlas: August through November 1991,
U.S. National Aeronautics and Space Administration.
Reference publication, Aug. 1992 NASA-RP-1283, 172p.,
 N93-12700, 12 refs.

Because of the great environmental significance of stratospheric ozone, and to support continuing research at the antarctic Southern Hemisphere stations, the development of the 1991 ozone hole was monitored using data from the Nimbus-7 Total Ozone Mapping Spectrometer (TOMS) instrument, produced in near- real-time. This atlas provides a complete set of daily polar orthographic projections of the TOMS total ozone measurements over the Southern Hemisphere for the period Aug. 1 through Nov. 30, 1991. The 1991 ozone hole developed in a manner similar to that of the 1987, 1989, and 1990 holes, reaching a comparable depth in early Oct. However, the 1991 ozone hole filled far more rapidly than in 1987 or 1989, and nearly 4 weeks earlier than in 1990. (Auth.)

I-48538

Mozurkewich, M., **Effect of competitive adsorption on polar stratospheric cloud reactions,** *Geophysical research letters*, Mar. 5, 1993 20(5), p.355-358, 15 refs.

In an analysis relevant to the formation of polar stratospheric clouds, existing laboratory data for reaction rates on ice and nitric acid trihydrate are interpreted in terms of a simple speculative mechanism for these reactions. The mechanism assumes that the solid phase is either pure H₂O or pure HNO₃(H₂O)₃ and that the state of the surface depends largely on the gas phase composition. This dependence is described by Langmuir adsorption isotherms. The adsorption of a nonreactive species can affect the rate of reaction by inhibiting the adsorption of reactive species. In particular, differences in reaction rates observed on ice and HNO₃(H₂O)₃ are attributed to the adsorption of gas phase HNO₃ produced by the decomposition of HNO₃(H₂O)₃. The interpretation of heterogeneous reaction rates requires detailed measurements of the rates as a function of gas phase composition. (Auth. mod.)

I-48539

Marti, J., Mauersberger, K., **Survey and new measurements of ice vapor pressure at temperatures between 170 and 250K,** *Geophysical research letters*, Mar. 5, 1993 20(5), p.363-366, 22 refs.

Saturated vapor pressures of ice at temperatures below 200K have become more important since the discovery of ice clouds in the polar stratosphere and upper mesosphere. Direct measurements of ice vapor pressures at such low temperatures are sparse and unreliable. This paper summarizes published vapor pressure data and presents new measurements at temperatures between 170 and 250K, extending the range of measured ice vapor pressures by three orders of magnitude. A simple empirical vapor pressure equation is derived which permits prediction of vapor pressures between 170K and the triple point of water, with an accuracy within about 2%. Predictions by this empirical equation agree, within experimental uncertainty, with the most reliable equation derived from thermodynamic principles. (Auth. mod.)

I-48540

Jones, P.D., Marsh, R., Wigley, T.M.L., Peel, D.A.,
Decadal timescale links between Antarctic Peninsula ice-core oxygen-18, deuterium and temperature, Holocene,
 1993 3(1), p.14-26, 34 refs.

The Antarctic Peninsula region has experienced a long-term warming trend over the twentieth century. For the period prior to

1900, there is conflicting evidence from different data sources. An initial interpretation of isotopic data from ice cores suggests that the nineteenth century was warmer than the twentieth century, although snow accumulation rate data for the nineteenth century from the same ice cores suggest lower temperatures. This paper studies the links among atmospheric temperature over the Antarctic Peninsula, circulation parameters and isotopic data over the period of instrumental records. The correlations between temperature and $\delta^{18}\text{O}$ and δD are generally of the order $r=0.5$ or less on timescales of one to five years. Conflicts between evidence from accumulation rate and isotopic data appear to reflect the influence of source-region effects on the isotope records. To clarify the complex isotopic records available for the Peninsula region, additional cores must be analyzed for both $\delta^{18}\text{O}$ and δD at the same site. (Auth. mod.)

I-48543

Silvente, E., Legrand, M.R., **Ammonium to sulphate ratio in aerosol and snow of Greenland and antarctic regions,** *Geophysical research letters*, Apr. 23, 1993 20(8), p.687-690, 17 refs.

The NH₄⁺ to SO₄²⁻ ratio of Greenland's atmospheric aerosols and snows are investigated. Data suggest that the atmospheric NH₄⁺ and SO₄²⁻ signals are well preserved in snow and that previous discrepancies observed between the composition of the air and that of the snow were likely due to NH₄⁺ artifacts. This study leads to the conclusion that NH₃ is not able to neutralize the acidity of the high latitude atmosphere, particularly in the Southern Hemisphere. (Auth. mod.)

I-48544

Russell, J.M., III, **HALOE antarctic observations in the spring of 1991,** *Geophysical research letters*, Apr. 23, 1993 20(8), p.719-722, 11 refs.

The Halogen Occultation Experiment (HALOE) observations of O₃, CH₄, HF, H₂O, NO, NO₂, and HCl collected during the Oct. 1991 antarctic spring period are reported. The data show a constant CH₄ mixing ratio of about 0.25 ppmv for the altitude range from 65 km down to about 25 km at the position of minimum wind speed in the vortex, i.e., the vortex center, and depressions in pressure versus longitude contours of NO, NO₂, HF, and HCl in this same region. Water vapor, HF, and HCl enhancement are also observed in the vortex center region above 25 km. Between 10 and 20 km, the expected mixing ratio signatures exist within the vortex, i.e., low ozone and dehydration. The water vapor increased by 50%, and the ozone level doubled inside the vortex between Oct. 11 and 24 in the 15 to 20 km layer. These changes imply a time constant for recovery from ozone hole conditions of 19 and 30 days for O₃ and H₂O, respectively. The data further show the presence of air inside the vortex between 3 and 30 mb which has mixing ratios characteristic of mid-latitudes. (Auth.)

I-48546

Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988, **Preprints**, Boston, American Meteorological Society, 1988, 160p., Refs. passim. For selected papers see 43-1492 through 43-1497 and 47-4174 through 47-4207, or I-38585, I-40901, I-40902, F-48555, and I-48547 through I-48554.

Of about 50 papers presented at the conference, 11 are pertinent to Antarctica. The latter include discussions of katabatic winds, their effect on blowing snow, and their interaction with ice; aerosols and their significance to air pollution and cloud droplets; synoptic and mesoscale atmospheric circulation; satellite tracking of clouds; the El Niño and Southern Oscillation; prediction of restricted visibility; snow albedos; and weather forecasting

I-48547

Wendler, G., **Measuring blowing snow in Adélie Land, eastern Antarctica**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.93-96, 20 refs.

A photoelectric snow particle counter was used to measure blowing snow at a site about 110 km south of Dumont d'Urville Station in Adélie Land in Dec. 1985. Snow suspended in the air increases the density of the air, and so increases the katabatic force. Stronger winds transport not only more snow particles but larger ones. Sublimation of snow particles in the air cools the air which also further strengthens the wind. The particular event measured wind speeds of about 8.5 to 12.5 m/s, snow particle frequencies from about 1100 to 2200 particles per sq cm/s, and mean particle sizes from about 98 to 128 microns in diameter. It was found that the flux in g/sq cm/s at a specific height equals the density of the snow (assumed at 0.9 g/cu cm), times the instrument constant (which depends on the distance between the two slits and the distance between the sender and receiver), times the frequency of the particles, times $\pi/4$, times d^3 (where d is the mean diameter of the particles). A linear relationship between the logarithm of the flux and the wind speed was observed.

I-48548

Parish, T.R., Pickett, J.L., **Numerical simulation of antarctic drainage flows**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.97-99, 9 refs.

It is suggested that numerical simulations of katabatic winds in Adélie Land should take into account the importance of confluence zones in the continental hinterland where drainage flows of air from a vast area converge and become focused on a restricted section of coastline. It is also suggested that the forcing of drainage winds is the result of strong radiational cooling by the sloping ice terrain. The intensity of katabatic winds is proportional to the steepness of the ice slopes and the intensity of the diabatic cooling in the lowest portion of the atmosphere. Numerical simulations indicate that the level of maximum wind speeds of approximately 20 m/s occur at a height of 175 m above the ground.

I-48549

Lal, M., **Submicron size aerosols and weather forecasting in East Antarctica**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.105-107, 3 refs.

Observations of atmospheric aerosols were made in Jan. and Feb. 1987 at the Indian stations of Maitri Hills and Dakshin Gangotri. Forty-six percent of the Aitken nuclei, that is, the smallest aerosols of .001 to .1 micron in radius, were in the concentration range of 250 to 500/cu cm. It was found that the Aitken nuclei concentration increased about 12-16 hours in advance of an approaching frontal weather system, resulting in overcast conditions. It is suggested that the study of aerosols in Antarctica could serve as an indicator of background pollution on a global scale.

I-48550

Saxena, V.K., Ruggiero, F.H., **Experimental studies of clouds and aerosols along the antarctic coast**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.108-111, 23 refs.

Observations of cloud droplet size distribution were carried out at McMurdo Station during Nov. 1980, and Dec. 1982-Jan. 1983, and

aerosols were sampled at Palmer Station during all of 1983. Coastal stratus clouds had an average droplet diameter of 9-13 microns, a liquid water content of 0.07-0.18%, and a total droplet concentration of 52-101 per cubic cm. All clouds showed a bimodal size distribution with an initial peak in concentration at a diameter around 4 microns and a second peak at a diameter varying with the height of the cloud base. The second peak was at 20 microns in clouds with a base height of 1450 m a.s.l. The mass contributions of elements to the aerosols averaged approximately as chlorine 21%, aluminum 21%, sodium 13%, silicon 12%, phosphorus 12%, sulfur 12%, potassium 3.7%, calcium 2.4%, titanium 1%, chromium 0.5%, and manganese, iron, cobalt, nickel, copper, and zinc, each less than 0.5%.

I-48551

Raschke, E., Bauer, P., Mölders, N., **Clouds over both polar regions from the ISCCP pilot data sets**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.137-140, 4 refs.

In this paper, cloud cover over both polar regions is analyzed by reference to satellite-derived radiometric data. This study demonstrates the utility of spaceborne photography in mapping cloud cover and albedo variations at the synoptic scale.

I-48552

Savage, M.L., Stearns, C.R., Weidner, G.A., **Southern Oscillation signal in Antarctica**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.141-144, 12 refs.

The El Niño/Southern Oscillation (ENSO) signal in Antarctica is discussed. Temperatures appear to fall the year following an ENSO. The coldest temperature on record, -89.6 C, at Vostok Station on July 21, 1983, occurred a year after the ENSO of 1982. The coldest July at the South Pole, -64.4 C in 1969, was also an ENSO year. It is also suggested that the anomalously low temperatures enhance drainage flow. While wind speeds were anomalously low at the South Pole in 1983, they were anomalously high at McMurdo Station on the coast.

I-48553

Obremski, J.S., Samson, J.A., Barnard, S.C., Murphey, B.B., Hogan, A.W., **Observation of recurrent temperature lapse near the surface at the South Pole**, MP 3262, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.145-147, 12 refs.

In Nov. 1983, a 30 m meteorological tower was erected at the South Pole to measure temperatures and winds. As used here, temperature lapse refers to the variation of temperature with height. Temperatures were measured in Jan. 1985 at the air-firn interface and at heights on the tower of 2, 6, 10, 14, 18, 22, and 26 m. The temperature minima often occurred several meters above the surface. Temperatures from day to day ranged from -18 to -28 C, but the temperatures usually varied less than a degree with height.

I-48554

Hale, R.A., Renard, R.J., **Statistical approach to prediction of restricted visibility at McMurdo and Williams Field, Antarctica**, Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988. Preprints, Boston, American Meteorological Society, 1988, p.148-150, 6 refs.

Discriminate and persistence forecasting are compared for predicting restricted visibility, that is, probabilities of visibilities less than

0.5 or 3.0 mi, in the warm season (Nov.-Feb.), and the cold season (Aug., Sep., Oct., and Mar.), for McMurdo Station and Williams Field, located about 5 km from McMurdo Station. The months of Apr.-July, in which the airfield is not in operation, are not considered. Tables are included which show the climatological probabilities for the two seasons; probabilities with initial-time weather conditions as precursors; and verification scores of the probabilities for discriminate and persistence forecasting. It is indicated that discriminate forecasting has a higher rate of correct prediction, but also a higher rate of falsely predicting restricted visibility, than does persistence forecasting.

I-48557

Jones, D.A., Simmonds, I., **Time and space spectral analyses of Southern Hemisphere sea level pressure variability**, *Monthly weather review*, Mar. 1993 121(3), p.661-672, 35 refs.

This study examines the time-space structure of the standard deviation of daily summer and winter mean sea level pressure over the Southern Hemisphere, as identified in 20 years of analyses generated by the Australian Bureau of Meteorology and two long simulations with a GCM. Analyses applied to the output of the GCM suggest that, overall, the model performs reasonably well, although the quality of the simulation of the low-frequency variability is inferior to that of the synoptic time scales. The tendency of the model to overpredict the winter daily mean sea level pressure variability in the South Pacific appears to be mostly due to this error in the low-frequency part of the field. These results reveal a considerable difference between the location of cyclone centers and bandpassed mean sea level pressure variability in the high southern latitudes. The model data imply that the maxima of the bandpassed variability tend to be some 30-40 deg. of longitude to the west and 5-7 deg. latitude to the north of those of cyclone centers. This serves to underline the dangers and ambiguity of referring to regions of high variability as "storm tracks."

I-48559

Pettré, P., Payan, C., Parish, T.R., **Interaction of katabatic flow with local thermal effects in a coastal region of Adélie Land, East Antarctica**, *Journal of geophysical research*, June 20, 1993 98(D6), p.10,429-10,440, 39 refs.

Results of a detailed climatological data analysis of Dumont d'Urville support the idea that katabatic flow can be locally enhanced by the diurnal cycle of solar insolation and the temperature contrast between the continent and the ocean. To estimate the effect of the temperature contrast between the ocean and the continent on the katabatic flow, two numerical experiments have been conducted. The simulations consider an ocean free of sea ice representative of the summer months, and another winter case with the ocean covered by thick sea ice. These simulations show that with the ocean free of sea ice, the katabatic flows extend only a limited distance over the open ocean during the day due to the local thermal effects. With the ocean covered by sea ice, the katabatic winds are not constrained and extend a considerable distance offshore. (Auth. mod.)

I-48560

Koehler, B.G., McNeill, L.S., Middlebrook, A.M., Tolbert, M.A., **Fourier transform infrared studies of the interactions of HCl with model polar stratospheric cloud films**, *Journal of geophysical research*, June 20, 1993 98(D6), p.10,563-10,571, 31 refs.

Heterogeneous reactions involving hydrochloric acid adsorbed on the surfaces of polar stratospheric clouds (PSCs) are postulated to contribute to polar ozone loss. Using Fourier transform infrared (FTIR) spectroscopy to probe the condensed phase, the authors examined the interaction of HCl with ice and nitric acid trihydrate (NAT) films representative of types II and I PSCs, respectively. For HCl

pressures in the range of .0000001 to .00001 Torr, FTIR studies show that a small amount of crystalline HCl·6H₂O formed on or in ice at 155 K. However, for higher HCl pressures the entire film of ice rapidly converted into an amorphous 4:1 H₂O:HCl mixture. For higher temperatures more closely approximating those found in the stratosphere, bulk HCl uptake by ice was not detected. Experiments also detected no bulk uptake of HCl by *alpha*-NAT or *beta*-NAT under various temperature and pressure conditions. Indirect evidence suggests that HCl adsorption onto the surface of model PSC films inhibited the evaporation of both ice and NAT by 3-5 K. (Auth. mod.)

I-48561

Brenninkmeijer, C.A.M., **Measurement of the abundance of CO-14 in the atmosphere and the C-13/C-12 and O-18/O-16 ratio of atmospheric CO with applications in New Zealand and Antarctica**, *Journal of geophysical research*, June 20, 1993 98(D6), p.10,595-10,614, 57 refs.

Equipment and methods for accurate and precise measurement of C-14, C-13, and O-18 isotope analysis for CO in background air, are presented along with new results for Antarctica and New Zealand. The CO-14 abundance and CO concentration in background air in New Zealand and Antarctica are similar, and both follow a distinct seasonal pattern, in particular CO-14, which is mainly forced by OH seasonality. The CO-14 abundance swings between its Feb. minimum of about 6 and its Aug. maximum of about 13 molecules per cu cm air. CO has a smaller seasonality and shows a larger scatter due to local CO sources. The impact of changes in solar activity on CO-14 for the period considered has been small. Most of the short-term variability in CO-14 is due to the sampling of different air masses. It appears that interannual OH variations may be reflected in CO-14 variations. Both C-13/C-12 and O-18/O-16 at Scott Base show large seasonal variation, and the impact of biomass burning and isotopic fractionation in CO destruction are used to try to explain the respective isotopic compositions. (Auth. mod.)

I-48562

Russell, J.M., III, **Halogen Occultation Experiment**, *Journal of geophysical research*, June 20, 1993 98(D6), p.10,777-10,797, 16 refs.

The Halogen Occultation Experiment (HALOE) was launched on the Upper Atmosphere Research Satellite (UARS) spacecraft Sep. 12, 1991, and after a period of outgassing, it began science observations Oct. 11. The experiment uses solar occultation to measure vertical profiles of O₃, HCl, HF, CH₄, H₂O, NO, NO₂, aerosol extinction, and temperature versus pressure with an instantaneous vertical field of view of 1.6 km at the Earth limb. Latitudinal coverage is from 80S to 80N over the course of 1 year and includes extensive observations of the antarctic region during spring. Examples of pressure versus latitude cross sections and a global orthographic projection for the Sep. 21 to Oct. 15, 1992 period show the utility of CH₄, HF, and H₂O as tracers, the occurrence of dehydration in the antarctic lower stratosphere, the presence of the water vapor hygropause in the tropics, evidence of antarctic air in the tropics, the influence of Hadley tropical upwelling, and the first global distribution of HCl, HF, and NO throughout the stratosphere. Nitric oxide measurements extend through the lower thermosphere. (Auth. mod.)

I-48599

Bronge, C., **Holocene climatic record from lacustrine sediments in a freshwater lake in the Vestfold Hills, Antarctica**, *Geografiska annaler. Series A: Physical geography*, 1992 74A(1), p.47-58, With German summary. 35 refs.

By means of studies of lake sediment cores retrieved from Nicholson Lake, Vestfold Hills, a climate chronology could be established, stretching from 6350 BP to the present. Climatic fluctuations were deduced on the basis of variations in organic and water contents,

diatomic assemblage and wet bulk density with sediment depth. The chronology was based upon radiocarbon datings of sediment samples. Cool periods in the longer time-scale lasted from 4950 BP to 3230 BP and from 1300 BP to 250 BP, approximately, which were consistent with long-term fluctuations found elsewhere. Brief but more pronounced cold episodes occurred about 3650-3550, 2950-2650, 2300-2000, 1300-1100 and 400-250 BP. Some of the cold events were similar in age to cold events occurring elsewhere, e.g. the 2300-2000 BP event. (Auth.)

I-48622

Allison, I., Wendler, G., Radok, U., **Climatology of the East Antarctic ice sheet (100E to 140E) derived from automatic weather stations**, *Journal of geophysical research*, May 20, 1993 98(D5), p.8815-8823, 33 refs.

The Australian National Antarctic Research Expeditions and the United States Antarctic Research Program of the National Science Foundation have built up two automatic weather stations (AWS) data nets in East Antarctica. There are a total of 16 stations in the area 55-145E and 65-75S, stretching from sea level to above 3000 m altitude. The records of 10 of these stations are sufficiently long to be adequate for a climatological study of the basic parameters of surface temperature, pressure, and wind and have been used in the study presented here. The station data were reduced to a common format and interpreted jointly to describe the broad-scale climatic features of the ice sheet. Climatological results include (1) an absolute lowest minimum temperature of -84.6 C at Dome C; (2) no minimum below -40 C at D10 near the coast; (3) a "coreless" winter temperature regime, without seasonal temperature trends for 6 months, at all stations; (4) mean surface wind speeds increasing to maxima near, rather than at, the coast; (5) high directional constancy in all seasons, with directions closer to the fall line in winter and during night hours than in summer and during day hours; (7) a distinct semiannual pressure variation with a main minimum in spring (Sep.) and a secondary minimum in autumn (Mar.); and (8) interrelationships among surface temperature, pressure, and wind related to the ice sheet topography. (Auth. mod.)

I-48623

Drdla, K., Turco, R.P., Elliott, S., **Heterogeneous chemistry on antarctic polar stratospheric clouds: a microphysical estimate of the extent of chemical processing**, *Journal of geophysical research*, May 20, 1993 98(D5), p.8965-8981, 44 refs.

This paper describes a detailed model of polar stratospheric clouds (PSCs) which includes nucleation, condensational growth, and sedimentation processes, and has been applied to the study of heterogeneous chemical reactions. For the first time, the extent of chemical processing during a polar winter has been estimated for an idealized air parcel in the antarctic vortex by calculating in detail the rates of heterogeneous reactions on PSC particles. The resulting active chlorine and NO_x concentrations at first sunrise are analyzed with respect to their influence upon the antarctic ozone hole, using a photochemical model. It is found that the species present at sunrise are primarily influenced by the relative values of the heterogeneous reaction rate constants (and thus the "sticking coefficients") and the initial gas concentrations. However, the extent of chlorine activation is also influenced by whether N₂O₅ is removed by reaction with HCl or H₂O. The reaction of N₂O₅ with HCl, which occurs rapidly on type 1 PSCs, activates the chlorine contained in the reservoir species HCl. Hence the presence and surface area of type 1 PSCs early in the winter are crucial in determining ozone depletion. (Auth. mod.)

I-48624

Smith, J.P., **Atmospheric NO₃. 4. Vertical profiles at middle and polar latitudes at sunrise**, *Journal of geophysical research*, May 20, 1993 98(D5), p.8983-8989, 14 refs.

Ground-based measurements of NO₃ absorption in the band near 662 nm were carried out on 4 occasions using the moon as a light source during sunrise at both middle and polar latitudes. As the sun rose, the observed slant column abundance of atmospheric NO₃ decreased systematically. The observed time-dependent decrease is due to the progression of the solar terminator down through the atmosphere, and provides a basis for inferring the vertical profile of NO₃ at sunrise. The inferred profiles are sensitive to the adopted NO₃ absorption cross sections and photolysis rates, and these sensitivities are investigated. Two sets of measurements made in Colorado during the summer display a large contribution to the total column from the troposphere, while two data sets obtained at McMurdo Station during the antarctic spring demonstrate that the column at that coordinate is almost entirely located in the stratosphere. The NO₃ abundances obtained in Antarctica are substantially smaller than those measured over Colorado, and show that NO₃ evolves only at altitudes where the temperature is high enough to allow its formation via the reaction of NO₂ and O₃. (Auth. mod.)

I-48646

Frederick, J.E., **Solar ultraviolet irradiance observed from southern Argentina: September 1990 to March 1991**, *Journal of geophysical research*, May 20, 1993 98(D5), p.8891-8897, 25 refs.

A comprehensive data set of solar ultraviolet spectral irradiance exists for Ushuaia, Argentina, approx. 55S, over the period from mid-Sep. 1990 to mid-Mar. 1991. This includes a season of prolonged depletion in column ozone over Antarctica, 10 deg or more in latitude poleward of Ushuaia. Cloudiness provides a major source of variance in the measurements. When this influence is removed, the irradiances at wavelengths between 300 and 310 nm are enhanced relative to clear sky calculations, based on a 10-year ozone climatology. During Dec. the average noontime irradiance at 306.5 nm, which is a good proxy for erythral irradiance, is 45% larger than the zonal mean climatological prediction. The largest noontime radiation levels observed at Ushuaia are equivalent to moving 20 deg in latitude closer to the equator at the summer solstice. (Auth. mod.)

I-48655

Turner, J., Thomas, J.P., **First assessment of the value of ERS-1 scatterometer winds for meteorological studies in the polar regions**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.2. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.701-704, ESA SP-359, 3 refs.

ERS-1 scatterometer winds for the southern ocean have been examined in conjunction with conventional surface meteorological analyses to assess their value in investigations of the meso- and synoptic-scale structure of high-latitude weather systems. Fast Delivery surface wind vectors for Jan. to July 1992 were examined. Early data showed significant problems with ambiguity removal, although later data were improved and only occasional directional errors were encountered. The resolution of the winds appeared variable, with constant directions and speeds being found occasionally over large areas. Early case studies show the potential of the data with good resolution of flow in the vicinity of fronts and around isolated islands. (Auth. mod.)

I-48657

King, J.C., **Recent climate variability in the Antarctic Peninsula**, Conference on Climate Variations, 5th, Denver, CO, Oct. 14-18, 1991. Preprints, Boston, American Meteorological Society, 1991, p.354-357, 9 refs.

Surface air temperature records for 1945-1990 from weather stations at Marguerite Bay, Faraday, King George I., South Orkney Is.,

and Halley, are compared. Records from this region show a greater degree of variability than those from other parts of Antarctica. Recent high temperatures and evidence of ice shelf retreat are indicative of a systematic warming; however, substantial interannual variations are superimposed on this warming trend. The climatic fluctuations observed are apparently regional rather than continental in scale. Figures and tables are included showing annual mean air temperatures, standard deviations, and mean maximum and minimum sea ice extent.

I-48670

Wolff, E.W., **Influence of local and global atmospheric pollution on the chemistry of antarctic snow and ice**, *Marine pollution bulletin*, 1992 25(9-12), p.274-280, 55 refs.

The antarctic ice sheet is the main sink for atmospheric pollution reaching the antarctic atmosphere from other continents. The ice preserves a historical record of the atmosphere that can be recovered in ice cores. No increasing trend is observed over recent decades for nitrate and sulphate. There appears to have been an increase of perhaps eight-fold in lead concentrations in antarctic snow, but the details of when the increase occurred have still to be defined. Many other species could be measured, but analytical problems have hampered such work. These studies would be impaired if emissions due to human activity in Antarctica became significant. The effect on snow concentrations of emissions from fuel and waste burning at antarctic stations and from vehicles is still mainly confined to small areas around the stations.

I-48671

Larsson, P., Järnmark, C., Södergren, A., **PCBs and chlorinated pesticides in the atmosphere and aquatic organisms of Ross Island, Antarctica**, *Marine pollution bulletin*, 1992 25(9-12), p.281-287, 26 refs.

PCBs, certain DDT and DDE compounds, and lindane were monitored in the lower atmosphere over Ross I., for 2 yrs. Geometrical means were 15.2 pg/cu m for PCBs, 2.0 pg/cu m for the DDT, 1.0 pg/cu m for the DDE and 25.8 pg/cu m for lindane. Atmospheric levels of lindane were positively correlated with temperature, and a significant difference was found between spring-summer and summer-winter concentrations. No season-related differences were found for the other chlorinated hydrocarbons, possibly owing to their lower vapor pressure and the cold climate. Periods with increased atmospheric levels of PCBs and DDT compounds were recorded. Lindane, the DDE and PCBs were present in fish and zooplankton sampled close to Ross I. Pollutant levels in the zooplankton (on an extractable fat basis) were highest during the antarctic spring and autumn and were inversely correlated to their fat content. (Auth. mod.)

I-48713

Cacciani, M., **Volcanic aerosol layers observed by lidar at South Pole, September 1991-June 1992**, *Geophysical research letters*, May 5, 1993 20(9), p.807-810, 12 refs.

During 1991 the terrestrial stratosphere went through a substantially increased aerosol load, due mainly to the eruptions of Mt. Pinatubo in the Philippines, and, to a lesser extent, to those of Mt. Hudson in Chile. This paper reports lidar observations of the stratospheric aerosols at South Pole. Two layers were present at different altitudes during the austral summer, but only the higher one persisted in the stratosphere until the onset of the polar stratospheric cloud (PSC) phenomenon. Data have been analyzed in terms of the integrated backscattering coefficient, and the aerosol mass content has been estimated. (Auth.)

I-48722

Randel, W., **Ideas flow on antarctic vortex**, *Nature*, July 8, 1993 364(6433), p.105-106, 10 refs.

An update is provided of research on the antarctic vortex as gained in recent publications and in an AGU Baltimore meeting in May 1993. The focus currently is on the air flow into or through the vortex. New results from the Upper Atmosphere Research Satellite (UARS) form the basis for identifying the vortex as a flowing processor. In other research, findings are interpreted as the vortex being restrained horizontally by the polar night jet stream and having a weak vertical flow within its confines. These results are briefly reviewed and discussed and questions they stimulated are posed.

I-48723

Manabe, S., Stouffer, R.J., **Century-scale effects of increased atmospheric CO₂ on the ocean-atmosphere system**, *Nature*, July 15, 1993 364(6434), p.215-218, 16 refs.

A coupled ocean-atmosphere climate model is used to study the evolution of the world's climate over the next few centuries, driven by doubling and quadrupling of the concentration of atmospheric CO₂. It projects global mean surface air temperature increases of about 3.5 and 7 C, respectively, over 500 years, and a sea-level rise owing to thermal expansion alone of about 1 and 2 m respectively (ice-sheet melting could make these values much larger). The thermal and dynamical structure of the oceans changes markedly in the quadrupled-CO₂ climate. In particular, the ocean settles into a new stable state in which the thermohaline circulation has ceased entirely and the thermocline deepens substantially. These changes prevent the ventilation of the deep ocean and could have a profound impact on the carbon cycle and biogeochemistry of the coupled system. In this study the model for climatic changes extends into both polar regions, with figures depicting the stream function of zonal mean meridional circulation and the geographical distributions of the increase of surface air temperature from the CO₂-quadrupling experiment. (Auth. mod.)

I-48738

Lorius, C.J., Jouzel, J., Raynaud, D., **Glacials-interglacials in Vostok: climate and greenhouse gases**, *Global and planetary change*, May 1993 71(1-3), p.131-143, 50 refs.

This paper interprets long term ice core records from Vostok Station, which may reveal close associations between changes in the atmospheric composition and glacial/interglacial changes. When compared with the preanthropogenic levels, the Vostok paleorecords show lower CO₂ and CH₄ concentrations and significant variations in aerosols of both terrestrial and oceanic origins. These changes, in particular those associated with greenhouse gases, may account for about half of the temperature change over the last climatic cycle. Although the interplay between the physical atmospheric and oceanic systems and the biosphere has still to be clarified, this finding may provide a clue to help in the prediction of future greenhouse gases-induced warming. In view of available paleodata, a warming of 3-4 C, at equilibrium, may be a realistic figure for a doubling of CO₂ concentrations or its equivalent. (Auth. mod.)

I-48739

Thompson, L.G., **"Recent warming": ice core evidence from tropical ice cores with emphasis on Central Asia**, *Global and planetary change*, May 1993 71(1-3), p.145-156, 24 refs.

Ice cores from the tropics and subtropics, in conjunction with those from the polar regions, provide a multifaceted record of environmental changes which can be viewed both spatially and temporally. This paper emphasizes the oxygen isotopic record preserved in cores from the poles to the tropics and assesses the evidence for global warming in the last 50-100 years. These records include: Camp Century, Greenland; Dundee and Guliya Ice Caps, China; Gregoriev Ice Cap, Kirghizia (formerly part of USSR); Quelccaya Ice, Peru; and Siple Station and South Pole, Antarctica. The central Asian records along with that from Quelccaya provide strong evidence of recent and

rapid warming in the tropics and subtropics. For the Dunde Ice Cap, where a long paleoclimatic record is available, the warming in this century appears to be unprecedented in the Holocene. These tropical and subtropical records contrast sharply with those from polar cores which show little evidence of a recent warming. These data suggest that either the recent warming is a middle and lower latitude phenomenon or that these high altitude tropical and subtropical glaciers may be more sensitive to climate changes than the massive polar ice sheets. Regardless, the current rapid disintegration of many tropical and subtropical glaciers may result in the permanent loss of numerous unique archives. (Auth. mod.)

I-48770

Lu, L.H., Bian, L.G., Jia, P.Q., **Characteristic parameters of the turbulent exchange near the surface at Zhongshan Station in Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.31-38, In Chinese with English summary. 11 refs.

Surface micrometeorological data, obtained at Zhongshan Station in 1990-1991, were analyzed to determine the turbulent exchange variations, including the Richardson number (Ri), sensible heat (SH), turbulent exchange coefficient (K), drag coefficient (CD) and the Bowen ratio (Bo). Preliminary results show Ri annual variations, with averages of -0.115 between Nov. and Feb. and 0.075 between May and July; the annual mean intensity of SH flux is -1.4W/sq. m; the annual mean value of K is 0.088 sq. m/s, and that of CD is 0.0111; and the Bo is 1.25 in summer and above 10 in winter.

I-48771

Liu, S.H., Xiong, K., **Characteristics of radiation over Mizuho Station in Antarctica**, *Antarctic research (Chinese edition)*, 1993 5(1), p.39-45, In Chinese with English summary. 10 refs.

Measurements of radiation components and micrometeorological observations were carried out in the atmospheric boundary layer at Mizuho Station in 1979 and 1980. The annual variations of radiation components, the effective emissivity of snow surface and atmosphere, the effective transmittance of the atmosphere, and the snow surface albedo have been calculated and analyzed. Relationships between the snow surface albedo and the spectral diffuse fluxes, and the solar elevation angle under clear sky, have also been analyzed. Preliminary results are discussed and presented in graphs. (Auth. mod.)

I-48796

Stefanutti, L., **Antarctic ozone lidar system**, *Applied physics B*, July 1992 55(1), p.3-12, 14 refs.

A new complex lidar, designed to measure tropospheric and stratospheric ozone, stratospheric aerosols and polar stratospheric clouds, and tropospheric clouds has been designed by IROE-CNR and SA-CNRS and implemented at the French antarctic base of Dumont d'Urville. A description of the system and some preliminary measurements carried out during the antarctic winter of 1991 are reported.

I-48803

Smith, V.R., **Climate change and ecosystem functioning: a focus for sub-antarctic research in the 1990s**, *South African journal of science*, Feb. 1993 89(2), p.69-71, 23 refs.

Sub-antarctic islands offer excellent opportunities to study ecological phenomena, especially functional responses of organisms, populations and ecosystems to perturbations. Recognizing this, the South African Committee for Antarctic Research recently launched a multidisciplinary project on the biological and ecological implications of climate change at South Africa's two sub-antarctic islands, Marion and Prince Edward. (Auth.)

I-48826

Wand, U., Maass, I., Haendel, D., **S-34 measurements in sulphates from antarctic atmospheric precipitations, lake waters and salt efflorescences** [S-34 Messungen am Sulfat antarktischer Niederschläge, Seewässer und Salzausblühungen—ein Beitrag zur Untersuchung des natürlichen Schwefelkreislaufs], *Polarforschung*, 1991 (Pub. 1992) 61(2/3), p.131-145, In German with English summary. Refs. p.144-145.

In remote areas of the world such as the Antarctic, S-34 analyses can be used to identify various sulphur sources (sea spray, biogenic and volcanic sources). The authors report here results of S-34 measurements on sulphates from recent atmospheric precipitations (snow), lake waters, and salt efflorescences sampled in the Schirmacher Oasis and the Gruber Mountains. By plotting the $\delta S-34$ of precipitation versus % sea-spray sulphate, the isotopic composition of the excess sulphate (which is probably of marine-biogenic origin) is extrapolated to be +4 per mill. Lake water sulphate and atmospheric precipitations have a comparable sulphur isotope composition (about +5 per mill). The analyzed secondary sulphates from the salt efflorescences, mainly gypsum and a few water-soluble sulphates (hexakdyrite, epsomite, burkeite, and pickeringite), vary in their isotopic composition between about -12 and +8 per mill. This wide scatter is probably due to chemical weathering of primary sulphides having different $\delta S-34$ values in the substratum. (Auth. mod.)

I-48853

Bidleman, T.F., **Organochlorine pesticides in the atmosphere of the southern ocean and Antarctica, January-March, 1990**, *Marine pollution bulletin*, May 1993 26(5), p.258-262, 39 refs.

Chlorinated pesticides in air were measured from the Greenpeace ship *Gondwana* between New Zealand and Ross I., Jan.-Mar., 1990. Geometric mean concentrations (pg/cu m) were: α and γ -hexachlorocyclohexanes=4.0 and 3.8, hexachlorobenzene=60, heptachlor epoxide=0.52, chlordanes+nonachlors=1.8, p,p'-DDE+p,p'-DDT=0.81. A trend of decreasing pesticide concentration at higher latitudes was noted. The low levels of DDTs found in this study and also during 1988-90 on Ross I. indicate that atmospheric DDT over the southern ocean has dropped markedly in the past decade. Recent concentrations of DDTs in antarctic air are similar to those in the Arctic. (Auth.)

I-48855

Dhaulakhandi, A.B., Joshi, R.P., Joshi, M.C., **Availability of photosynthetically active radiation in Antarctica**, *Current science*, Jan. 10, 1993 64(1), p.39-40, 5 refs.

Reported here are the photosynthetically active radiation (PAR) variations on Antarctica at latitude 70S for a summer period. The variations in PAR are intense in Antarctica because of its unique polar position and weather conditions. Data are presented on clear-day PAR variations on the ice shelf and inside the greenhouse at Maitri Station, collected during the 10th Indian Scientific Expedition to Antarctica. The highest PAR level at the ice surface attains 90,000 lux. The PAR level at Maitri is somewhat low, the maximum value being 81,000 lux. The PAR level remains at minimum 20,000 lux between the hours 01 and 20. Peak levels occur between 08 and 16 hours. The PAR levels inside the greenhouse vary from 100 lux to 45,000 lux. (Auth.)

I-48863

Gaigerov, S.S., Zaichikov, B.P., Kalikhman, M.IA., **Turbulence in the antarctic middle atmosphere** [O turbulentnosti v srednej atmosfere Antarktiki], *Antarktika: doklady komissii*, 1992 No.30, p.5-8, In Russian with English summary. 9 refs.

Weather observation data at Molodezhnaya Station in July-Aug. 1988 show that the most intense winter disturbances, temperature fluctuation, and wind in the stratosphere coincide with the radon maximum concentration in the lower atmosphere. These results are attributed to the appearance, propagation and disruption of internal gravity atmospheric waves. (Auth. mod.)

I-48864

Koshel'kov, I.U.P., Kovshova, E.N., Voskresenskiĭ, A.I., **Temperature trends in the lower antarctic stratosphere** [O temperaturnykh trendakh v nizhnei stratosfere nad Antarktikoĭ], *Antarktika; doklady komissii*, 1992 No.30, p.9-12, In Russian with English summary. 5 refs.

Long term temperature variations (1958-1989) at the 100 mb level, measured at several antarctic stations from Dec. through May and presented in tables, show prevailing negative trends during the summer and fall seasons of the latest years.

I-48865

Tarasenko, D.A., **Spring reversals of circulation over the Antarctic** [Vesennie perestroiki tsirkulatsii nad Antarktikoĭ], *Antarktika; doklady komissii*, 1992 No.30, p.13-17, In Russian with English summary. 12 refs.

Interrannual variations of dates of spring circulation reversals over the Antarctic, obtained at Molodezhnaya Station between 1969 and 1989, are discussed and presented in tables. Differences in spring circulation regimes of high latitudes in both hemispheres are shown at stratospheric and mesospheric levels. (Auth. mod.)

I-48866

Liubarskiĭ, A.N., **Large-scale statistical structure of antarctic temperature fields** [Krupnomasshtabnaia statisticheskaya struktura temperaturnykh poleĭ Antarktiki], *Antarktika; doklady komissii*, 1992 No.30, p.18-25, In Russian with English summary. 18 refs.

Various degrees of temperature field homogeneity for different antarctic regions are determined by means of a modified method of the correlation structure description. The assessment of its connection with non-stationary temperature changes, and the possibility of their forecasting, has been carried out. The relationship between spatial distribution of temperature in the Antarctic and the influence of orographic and cryogenic factors is established. On the basis of this relationship, the gradients of temperature between coastal and continental areas of the Antarctic have been calculated. Based on spatial correlation scale estimation in temperature fields, the precise division of climatic parameters in the Antarctic and Subantarctic is shown. The sectorial structure of the antarctic coastal zone temperature fields has been determined. The scientific validity of the division of Antarctica into three zones, according to the zones of hydrometeorological information services for navigation, has been confirmed. (Auth. mod.)

I-48906

Lucas, M.I., Lindesay, J.A., **Global climate change: environmental and climatic links between Antarctica and South Africa**, *South African journal of antarctic research*, 1991 21(2), p.193-219, Refs. p.215-219.

In this review, the authors outline how the earth's climate evolved and took shape in response to the geological evolution of continental Antarctica and the southern ocean. They then summarize global climate, climate change, the role of the oceans and the antarctic ecosystem. This leads to identified links between present-day global and Southern Hemisphere climate with Antarctica and the southern ocean. Finally, they provide some insight into the possible feedback responses of these high latitudes to future climate change scenarios.

Current South African marine research programs which address these issues are also outlined. (Auth.)

I-48907

Bodeker, G.E., Scourfield, M.W.J., **SANAE total column ozone: 1980 to 1990**, *South African journal of antarctic research*, 1991 21(2), p.220-221, 1 ref.

TOMS (Total Ozone Mapping Spectrometer) data have been processed for a period of 11 years, from 1980 to 1990, over an area extending from 10W to 39E and from the equator to the South Pole. This area includes South Africa, much of the South African southern oceans and the South African antarctic research base, SANAE. Daily total column ozone values have been obtained for SANAE Station and monthly and yearly means have been calculated. Decreases in monthly averages are clearly evident, while yearly averages show a decrease of 4.9 DU/year. For comparison purposes, Durban shows a decrease of 1.5 DU/year over the same period.

I-48908

Stephenson, J.A.E., Scourfield, M.W.J., **Natural ozone depletion over Antarctica**, *South African journal of antarctic research*, 1991 21(2), p.222, 3 refs.

The loss of stratospheric ozone caused by the reaction of ozone with nitric oxide generated by energetic protons, associated with solar flares, is examined. During large solar flares in Mar. 1989, satellite observations reveal depletion over the southern polar regions, shown in a color plot of Mar. 21. This color plot uses data obtained from the total ozone mapping spectrometer (TOMS) aboard the Nimbus 7 satellite launched in 1978. The experiment measures the daily global distribution of total column ozone.

I-48957

Elkins, J.W., **Decrease in the growth rates of atmospheric chlorofluorocarbons 11 and 12**, *Nature*, Aug. 26, 1993 364(6440), p.780-783, 37 refs.

Here the focus is on CFC-11 (CCl₃F) and CFC-12 (CCl₂F₂), which are used for refrigeration, air conditioning and the production of aerosols and foams, and which together make up about half of the total abundance of stratospheric organic chlorine. A significant recent decrease in the atmospheric growth rates of these two species is reported, based on measurements spanning the past 15 years and latitudes ranging from 83N to 90S. This is consistent with CFC-producers' own estimates of reduced emissions. If the atmospheric growth rates of these two species continue to slow in line with predicted changes in industrial emissions, global atmospheric mixing ratios will reach a maximum before the turn of the century, and then begin to decline. (Auth.)

I-48975

Mo, K.C., **Global climate of September-November 1990: ENSO-like warming in the western Pacific and strong ozone depletion over Antarctica**, *Journal of climate*, July 1993 6(7), p.1375-1391, 10 refs.

This paper presents a global seasonal climate summary for the Sep-Nov. 1990 interval. Included are details which document an episode of atmospheric warming in the tropical western Pacific; above-normal air temperatures in the Northern Hemisphere; and ozone depletion in the antarctic stratosphere.

I-49001

Savoie, D.L., **Nitrogen and sulfur species in antarctic aerosols at Mawson, Palmer Station, and Marsh (King George Island)**, *Journal of atmospheric chemistry*, Aug. 1993 17(2), p.95-122, 43 refs.

High volume bulk aerosol samples were collected continuously at three antarctic sites: Mawson from Feb. 20, 1987 to Jan. 6, 1992;

Palmer Station from Apr. 3, 1990 to June 15, 1991; and Marsh from Mar. 28, 1990, to May 1, 1991. All samples were analyzed for Na⁺, SO₂-4, NO-3, methanesulfonate (MSA), NH⁺4, Pb-210, and Be-7. At Mawson, for which there is a multiple year data set, the annual mean concentration of each species sometimes varies significantly from one year to the next. A similar analysis indicates that the nss SO₂-4/MSA ratio at Palmer is about 40% lower, and more comparable to previous results over the southern oceans. These results suggest that the differences in the ratio may reflect a more rapid loss of MSA relative to nss SO₂-4 during transport over Antarctica from the oceanic source region. The mean Pb-210 concentrations at Palmer and Marsh and the mean NO-3 concentration at Palmer are about a factor of two lower than those at Mawson. These features and the similar seasonalities of NO-3 are continental. In contrast, the mean concentrations of MSA, nss SO₂-4, and NH⁺4 at Palmer are all higher than those at Mawson: MSA by a factor of 2; nss SO₂-4 by 10%; and NH⁺4 by more than 50%. However, the factor differences exhibit substantial seasonal variability; the largest differences generally occur during the austral summer when the concentrations of most of the species are highest. (Auth. mod.)

I-49017

De Mora, S.J., Patterson, J.E., Bibby, D.M., **Baseline atmospheric mercury studies at Ross Island, Antarctica**, *Antarctic science*, Sep. 1993 5(3), p.323-326, 22 refs.

The first extended baseline studies of total gaseous mercury (TGM) and dimethylmercury (DMM) in Antarctica are reported. Mean TGM concentrations of 0.52, 0.60 and 0.52 ng/cu m were obtained for three consecutive years at the southern tip of Ross I. The levels of DMM in Antarctica are less than 10% of the TGM, and frequently fall below the detection threshold. These results represent the lowest TGM concentrations recorded globally, and extend into polar regions the observation of a decrease in atmospheric mercury concentration with increasing latitude. (Auth.)

I-49020

Ma, Y.M., **Simulation of katabatic winds at Mizuho Station, Antarctica**, *Antarctic research*, June 1992 3(1), p.25-30, 7 refs.

A new simulation method for solving dynamic equations for stationary katabatic wind is suggested. This is based on the assumptions that the turbulent exchange coefficient is a function of height, and that the effect of the cold sloping surface is a multinomial function of height. Calculated wind profiles agree with observational data at Mizuho Station. (Auth.)

I-49039

Tabazadeh, A., Turco, R.P., **Model for heterogeneous chemical processes on the surfaces of ice and nitric acid trihydrate particles**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,727-12,740, 53 refs.

This paper presents a model that incorporates the physics and physical chemistry of ice surfaces relevant to polar stratospheric clouds. Assorted adsorption isotherms are used to compute surface concentrations of H₂O, HCl, HOCl, ClONO₂ and N₂O₅ on ice and nitric acid trihydrate (NAT) crystals. Surface reaction rates and reaction probabilities (sticking coefficients) are determined. The model parameters (surface morphology and energies) are extracted from measured uptake coefficients and reaction probabilities. The model is applied to analyze laboratory data, leading to estimates of adsorption free energies, enthalpies and entropies for HCl, HOCl, ClONO₂ and N₂O₅ on ice and NAT surfaces, and activation energies for the heterogeneous reactions of HCl and H₂O with HOCl, ClONO₂ and N₂O₅ on these surfaces. The energy parameters are used to calculate surface parameters such as adsorption and desorption constants, surface coverages, reaction rate coefficients, surface diffusion coefficients and reaction probabilities for various species and

chemical interactions on ice and NAT surfaces. Implications for chemical processing on polar stratospheric clouds are discussed. (Auth. mod.)

I-49040

Rosen, J.M., Kjome, N.T., Oltmans, S.J., **Simultaneous ozone and polar stratospheric cloud observations at South Pole Station during winter and spring 1991**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,741-12,751, 36 refs.

Simultaneous polar stratospheric cloud (PSC) and ozone measurements were made over South Pole Station using a two-wavelength backscattersonde. The backscattersondes were supplemented with occasional frost point soundings. The measurements made before the appearance of PSCs do not show clear evidence of particle deliquescence, suggesting that the background sulfate particles may be frozen solids rather than liquids. PSCs began appearing at 20 km when the temperature at that altitude dropped to -80 C. Initially, there was apparent evidence of supersaturation (with respect to nitric acid trihydrate) associated with some type I PSCs, while other examples indicated that the condensation of nitric acid was in quantitative agreement with that expected from the saturation vapor pressure and available nitric acid vapor. The apparent supersaturated layers can alternatively be interpreted as denitrified regions. The mode radius of the first observed PSCs of the season was 0.5 micron. In the polarization sensitive sounding, two varieties of type I PSCs were observed, one of which exhibited significant depolarization and another which produced very little depolarization. At the precise time that sunlight was returning to the stratosphere near South Pole Station, a strong inverse correlation in the structure of PSCs and ozone mixing ratio was observed. Using trajectory analysis, the authors suggest that the effect is probably the result of chemical depletion rather than transport processes. This chance observation is consistent with enhanced ozone depletion occurring in association with sunlit PSCs during the early spring. (Auth. mod.)

I-49041

Herman, J.R., McPeters, R., Larko, D.E., **Ozone depletion at northern and southern latitudes derived from January 1979 to December 1991 Total Ozone Mapping Spectrometer data**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,783-12,793, 48 refs.

Long-term ozone depletion rates have been computed from 13 years of Nimbus 7/Total Ozone Mapping Spectrometer (TOMS) data as a function of latitude, longitude, and month for the period Jan. 1, 1979, to Dec. 31, 1991. In both hemispheres the amount of ozone has decreased at latitudes above 30 deg by amounts that are larger than predicted by homogeneous chemistry models for the 13-year time period. The largest rates of ozone decrease occur in the Southern Hemisphere during winter and spring, with partial recovery during the summer and autumn. Ozone time series data have been examined for effect of volcanic eruptions on stratospheric ozone observed by TOMS, with only the Mount Pinatubo stratospheric aerosol injection affecting ozone amounts for a few months after the eruption in June 1991. The TOMS data show no ozone perturbation after the El Chichon eruption, or after any of the other smaller equatorial eruptions, that cannot be explained by interference effects between the annual El Nino/Southern Oscillation, and Quasi-Biennial Oscillation cycles. The effect of the stratospheric aerosol scattering phase function is clearly seen in the high spatial resolution TOMS ozone data after El Chichon and Mount Pinatubo. Errors caused by the short-term presence of stratospheric aerosols in the TOMS zonally averaged ozone data are less than 1% before correction, and have no significant effect on ozone trend determination. (Auth. mod.)

I-49042

Parish, T.R., Pettré, P., Wendler, G., **Numerical study of the diurnal variation of the Adélie Land katabatic wind regime**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,933-12,947, 30 refs.

Data collected by automatic weather stations along a string of stations from the coast of Adélie Land to the high interior plateau show a marked diurnal cycle of the katabatic wind and temperature regimes of the lower atmosphere during the short austral summer period. Numerical simulations of the katabatic wind regime have been conducted for a variety of solar forcing and synoptic conditions, assuming a clear sky environment. Results suggest that the katabatic wind is a robust feature of the antarctic boundary layer. Significant disruption of the low-level drainage features occurs only during the midsummer months, owing to solar heating of the ice slopes and from synoptic activity along the Adélie Land coastline. During midsummer, modeled ground temperatures undergo a diurnal cycle with an amplitude of 15 C near the coast, in good agreement with recorded observations. The katabatic wind decreases considerably during the middle of the day; wind speeds at coastal sites reduce to less than half of the early morning values. The numerical simulations depict a rapid summer to winter transition of katabatic wind conditions over the 1-month period from mid-Feb. to mid-Mar. The surface energy budget becomes negative for the entire 24-hour period after mid-Feb., corresponding to the rapid onset of the wintertime katabatic wind regime. (Auth. mod.)

I-49043

King, J.C., **Control of near-surface winds over an antarctic ice shelf**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,949-12,953, 17 refs.

In this paper, simple models are used to assess the factors controlling near-surface winds over an antarctic ice shelf. Observations from Halley Station and an automatic weather station situated close to the coastal slopes adjoining the Brunt Ice Shelf are presented. These suggest that katabatic flows originating over the continental slopes adjust more quickly to the regional easterly flow over the ice shelf than is predicted by these simple models. It is suggested that nonlinear mechanisms such as "hydraulic jumps" or internal gravity wave radiation could lead to flow adjustment on the short space and time scales observed. In contrast with the present observations, katabatic flows have been observed to propagate across the Ross Ice Shelf for great distances with little modification. However, in this latter region the topography favors the formation of intense, channeled katabatic flow, while the katabatic flow onto the Brunt Ice Shelf is unconfined and consequently much weaker. (Auth. mod.)

I-49044

Dalu, G.A., **Climatic atmospheric outflow at the rim of the Antarctic continent**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,955-12,960, 21 refs. For another version see I-47812.

This paper examines the role of the net radiative cooling and of warm air entrainment in determining the intensity of the cold-air outflow at the rim of the antarctic continent. The result shows that a large amount of cold air, significant on even a global climatological scale, is exported through this process from high- to low-latitude regions. Observations show that katabatic winds in the near-coastal region can be periodic or continuous, or can first remain in a quiescent near-critical state, then burst into short and strong gusts. This complex behavior is described by a nonlinear system, where the relevant parameter is the Froude number of the inflow at a Rossby radius distance from the coast. The analytical theory developed agrees well with qualitative features observed. (Auth. mod.)

I-49045

Stone, R.S., **Properties of austral winter clouds derived from radiometric profiles at the South Pole**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,961-12,971, 60 refs.

A unique set of measurements consisting of infrared flux profiles (radiometersonde data) collected at the South Pole is analyzed in conjunction with ancillary meteorological observations to gain a better understanding of austral winter clouds. Distinct radiometric features associated with cloud boundaries are used to estimate the heights, thicknesses, and temperatures of selected cloud systems. The physical cloud properties are combined with infrared flux measurements to formulate the thermal energy budgets of the cloud layers and to derive their bulk radiative properties. By comparing these derived radiative properties with theoretically computed values for model clouds varying in microphysical characteristics, the clouds' ice contents and effective particles sizes are also inferred. The characteristic radiometric features that distinguish overcast from clear sky conditions at South Pole are discussed; mean profiles of infrared fluxes, temperatures, vector winds, and heating rates are presented; and a summary is provided of cloud properties that may be of use to climate modelers. (Auth. mod.)

I-49046

Carrasco, J.F., Bromwich, D.H., **Mesoscale cyclogenesis dynamics over the southwestern Ross Sea, Antarctica**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,973-12,995, 44 refs.

Four mesoscale cyclones that formed near Terra Nova Bay between Feb. 16 and 20, 1988 are examined, using all available observations, including automatic weather station data, high-resolution satellite images, satellite soundings, and hemispheric synoptic analyses. The first two cyclones formed on low-level baroclinic zones established by the synoptic scale advection of warm moist air toward the cold continental air blowing gently from East Antarctica. The third mesocyclone formed shortly thereafter, on a baroclinic zone over the polar plateau; the second vortex completely disrupted the usual katabatic drainage over the plateau and forced warm moist air over the coastal slopes. The fourth mesoscale low formed in conjunction with an abrupt and intense surge of katabatic air from Terra Nova Bay which sharpened the coastal baroclinic zone. At the same time a transiting midtropospheric trough, probably associated with lower tropospheric upward vertical motion, apparently accelerated the katabatic winds and triggered the vortex formation. A similar katabatic wind-forced mesocyclone formed near Byrd Glacier. The two vortices moved to the east-southeast and northeast, respectively, apparently being steered by the generating katabatic airstreams, and merged just to the north of the Ross Ice Shelf. The combined vortex reintensified as another trough passed overhead, and moved eastward to West Antarctica where it dissipated two days later. (Auth. mod.)

I-49047

Carleton, A.M., Fitch, M., **Synoptic aspects of antarctic mesocyclones**, *Journal of geophysical research*, July 20, 1993 98(D7), p.12,997-13,018, 68 refs.

The characteristic regimes (formation and dissipation areas, tracks) and synoptic environments of cold air mesocyclones over antarctic and subantarctic latitudes are determined for the contrasting winters (June, July, and Aug.) of 1988 and 1989. Defense Meteorological Satellite Program (DMSP) thermal infrared (IR) imagery is used in conjunction with Southern Hemisphere pressure/height analyses. Outbreaks of mesocyclones, frequent in the Ross Sea sector in 1988, are associated most often with areas of maximum horizontal gradient of 1000- to 500-mbar thickness. Over higher latitudes of the Southeast Pacific in 1989, mesocyclones developed in association with a "cold pool" that migrated equatorward. The between-winter differences in mesocyclone frequencies are examined for associations

with sea ice conditions and the continental katabatic winds, using correlation and "superposed epoch" analysis of temperature data from selected automatic weather stations. The results support a katabatic wind-sea ice extent-mesocyclone link for key sectors of the Antarctic. (Auth. mod.)

I-49048

Turner, J., Lachlan-Cope, T.A., Thomas, J.P., **Comparison of arctic and antarctic mesoscale vortices**, *Journal of geophysical research*, July 20, 1993 98(D7), p.13,019-13,034, 47 refs.

In this paper, mesoscale (less than 100 km) vortices occurring in the two polar regions are considered in terms of their geographical and seasonal distribution, satellite cloud signatures and forcing mechanisms. Environmental conditions important in the development of the vortices are considered, including sensible heat flux, stability throughout the troposphere, and synoptic factors such as baroclinicity and upper air cold pools. A scheme to classify the observed vortices in the two polar regions in terms of the physical mechanisms behind their formation and development is proposed. The major differences between the polar systems are the lack of deep convection in the Southern Hemisphere, which precludes the development of many of the vigorous types of system found in the north, and the major role that topography plays in the antarctic coastal region. The most common type of vortex found in the Antarctic occurs over the ice-free ocean to the west of synoptic scale disturbances, and is similar to the type of northern system known as a comma cloud. (Auth. mod.)

I-49049

Arpe, K., Cattle, H., **Comparison of surface stress and precipitation fields in short-range forecasts over the antarctic region**, *Journal of geophysical research*, July 20, 1993 98(D7), p.13,035-13,044, 14 refs.

A comparison is made of wind stresses derived from the European Centre for Medium-Range Weather Forecasts (ECMWF) and United Kingdom Meteorological Office (UKMO) operational numerical weather prediction models over the antarctic region for the periods June 1 to July 27, 1988, and through July 1990. Comparison of model precipitation fields over the region is also made for the July 1990 period. Mean fields are found to be qualitatively similar over much of the antarctic sea ice zone. A particular feature of the comparisons is a large discrepancy in the values of the wind stress shown by the models around the antarctic coastal zone. These are investigated in detail for the July 1990 period by reference to contemporaneous observations. Both precipitation and surface stress fields reveal a generally high similarity in their variability in space and time overall, illustrating the influence of the observational data on the model fields. (Auth. mod.)

I-49050

Bromwich, D.H., Carrasco, J.F., Liu, Z., Tzeng, R.Y., **Hemispheric atmospheric variations and oceanographic impacts associated with katabatic surges across the Ross Sea Shelf, Antarctica**, *Journal of geophysical research*, July 20, 1993 98(D7), p.13,045-13,062, 45 refs.

Numerical simulations and surface-based observations show that katabatic winds persistently converge toward and blow across the Siple Coast part of West Antarctica onto the Ross Ice Shelf. About 14% of the time during winter (Apr. to Aug. 1988), thermal infrared satellites images revealed the horizontal propagation of this negatively buoyant katabatic airstream for about 1000 km across the ice shelf to its northwestern edge, a trajectory that nearly parallels the Transantarctic Mountains. This takes place when the pressure field supports such airflow, and is caused by synoptic scale cyclones that decay near and/or over Marie Byrd Land. The northwestward propagation of the katabatic winds is also accompanied by other changes in the hemispheric long wave pattern. An immediate impact of the katabat-

ic airflow crossing from the ice shelf to the Ross Sea is expansion of the persistent polynya that is present just to the east of Ross I. This polynya is a conspicuous feature on passive microwave images of antarctic sea ice, and plays a central role in the salt budget of water masses over the Ross Sea continental shelf. The impact of this katabatic airflow upon mesoscale cyclogenesis over the South Pacific Ocean is also discussed. (Auth. mod.)

I-49051

Yasunari, T., Kodama, S., **Intraseasonal variability of katabatic wind over East Antarctica and planetary flow regime in the southern hemisphere**, *Journal of geophysical research*, July 20, 1993 98(D7), p.13,063-13,070, 21 refs.

The intraseasonal variation (30- to 50-day period) of katabatic wind as registered at Mizuho Plateau, East Antarctica, is a predominant mode of the subseasonal time scale variability. The atmospheric circulation in the southern middle and polar latitudes associated with this fluctuation of katabatic wind has been deduced by using the NMC gridded 500-mbar zonal wind and geopotential height field. The axisymmetric circulation pattern to Antarctica is detectable in the anomalous zonal wind and height field. These results strongly suggest that the intraseasonal variation in katabatic wind regime over East Antarctica is part of the modulation of planetary flow regime and meridional circulation in the southern middle and high latitudes, i.e., part of the index cycle of the Southern Hemisphere. (Auth. mod.)

I-49052

Smith, S.R., Stearns, C.R., **Antarctic pressure and temperature anomalies surrounding the minimum in the Southern Oscillation index**, *Journal of geophysical research*, July 20, 1993 98(D7), p.13,071-13,083, 25 refs. For another version see I-47948.

This paper analyzes surface pressure and temperature patterns in Antarctica to reveal relationships with the El Niño/Southern Oscillation (ENSO). Using monthly anomalies of surface pressure and temperature in Antarctica, lag correlations are made to the Southern Oscillation index (SOI) and annual composites are created for years where ENSO is in a warm phase. Comparisons are made to annual composites for nonwarm phase years and to 6 individual ENSO warm phases occurring between 1957 and 1984. It is hypothesized that the temperature and pressure anomaly patterns are related, through a thickness argument, to the 500-mbar southern hemispheric flow and the Australian branch of the Southern Oscillation. (Auth. mod.)

I-49054

Caricchia, A.M., **PAHs in the atmospheric particulate in the area of the Italian scientific base in Antarctica**, *Water science and technology*, 1993 27(7-8), p.235-243, 5 refs.

Data on PAH levels in atmospheric particulates were determined in the frame of environmental protection activities during the 6th Italian Expedition in Antarctica. Samples were collected at the four cardinal points at about 200 m from the central point of the Italian scientific base. Results are related to basic meteorological parameters, operating parameters and fuel consumption of the waste incinerator, power generators and other engines. Data show low levels of the individual PAH (95% in the range 1-50 pg/cu m) confirming the absence to date of relevant contamination from the Italian base. On the basis of these preliminary results, the monitor program will continue in future expeditions in order to control potential PAH sources. (Auth.)

I-49055

Oeschger, H., **Information on the history of atmospheric CO₂ and the carbon cycle from ice cores**, Carbon dioxide and other greenhouse gases: climatic and associated impacts. Edited by R. Fantechi et al, Dordrecht, Kluwer Academic Publishers, 1989, p.40-54, 31 refs. Included in Commission of the European Communities Symposium, Brussels, Belgium, Nov. 3-5, 1986. Proceedings.

DLC QC981.8.C5 C367

CO₂ concentration measurements on air extracted from polar ice cores sampled at Siple Station enable a surprisingly precise reconstruction of the atmospheric CO₂ increase since 1800. Carbon cycle model calculations of the total CO₂ input due to human activities yield results which are compatible with independent estimates. The good agreement between observation and model interpretation inspires confidence in projections of the future atmospheric CO₂ increase for given CO₂ emission scenarios. The overall conclusions of this study are the following: the consistent picture evolving from experimental and theoretical work on the carbon cycle history is encouraging; the observation of strong carbon cycle changes in the past indicates the complexity of natural systems and the uncertainty of predictions of their reaction to greenhouse forcing. (Auth. mod.)

I-49056

Lorius, C.J., **Polar ice cores and climate**, NATO Advanced Research Workshop on Climate and Geo-Sciences, Louvain-la-Neuve, Belgium, May 22-27, 1988. Proceedings. A challenge for science and society in the 21st century. Edited by A. Berger et al, NATO Advance Science Institutes, Series C. Mathematical and Physical Sciences. Vol.285, Dordrecht, Kluwer Academic Publishers, 1989, p.77-103, Refs. p.100-103.

DLC QC980.N38

Polar ice cores are providing multiple proxy records of climate and related parameters. They show evidences of anthropogenic impact on aerosol concentrations in Greenland snow and, on a global scale, on greenhouse gases such as CH₄ and CO₂. Greenland ice has recorded rapid changes of climate during the last ice age and deglaciation. Antarctic cores have shown a close association between CO₂ and climate throughout the last climatic cycle. New results on methane and sulfates further support the picture of large chemical atmospheric modifications, some of them involving the biosphere, which have likely contributed in glacial interglacial climatic changes. This paper examines the implications of these results. (Auth. mod.)

I-49059

Gras, J.L., **Condensation nucleus size distribution at Mawson, Antarctica: seasonal cycle**, *Atmospheric environment*, June 1993 27A(9), p.1417-1425, 29 refs.

The size distribution of atmospheric condensation nuclei has been measured at Mawson, on the antarctic coast, during the period 1985-1990. A clear seasonal cycle is demonstrated in the size distribution with periods of marked bimodality during early spring and autumn. Between these periods, in late spring and summer, steady growth in particle size followed by a period with a relatively stable size distribution and relatively little new particle production were observed. During the remaining part of the year the nucleus mode particle concentrations were low, typically less than 20/cu cm. (Auth. mod.)

I-49060

Gras, J.L., **Condensation nucleus size distribution at Mawson, Antarctica: microphysics and chemistry**, *Atmospheric environment*, June 1993 27A(9), p.1427-1434, 30 refs.

This work examines the annual evolution of the condensation nucleus size distribution and its relationship with other aerosol micro-

physical and chemical parameters in the lower atmosphere over Antarctica. Good agreement is observed between the seasonal cycles of aerosol volume and non-sea-salt sulfate. Changes between periods with strong bimodality and periods with a weak or missing nucleus mode are interpreted in terms of a seasonally varying precursor sulfur source strength and aerosol surface area. Although only limited measurements of SO₂ concentration for this region are available, conditions under which these are consistent with the observed SO₄ levels are considered. The observed relationships between microphysical and chemical properties of the aerosol strongly support the notion that the dominant source of nuclei in remote southern locations, including Antarctica, is maritime, and that these nuclei result from the oxidation of dimethyl sulfide to methane sulfonate and sulfate. (Auth. mod.)

I-49084

Fraser, G.J., Hernandez, G., Smith, R.W., **Eastward-moving 2-4 day waves in the winter antarctic mesosphere**, *Geophysical research letters*, Aug. 6, 1993 20(15), p.1547-1550, 18 refs.

The structure of short period (2-4 days) planetary waves in the antarctic mesosphere has been determined from ground-based wind measurements. At the South Pole, observations are made with a Fabry-Perot spectrometer (FPS) to determine the meridional wind component of OH tracer molecules. Azimuth scanning of the FPS shows that the observed modes are of zonal wavenumber one, as expected at the rotation pole in the neutral atmosphere. At Scott Base observations are made with an MF spaced-antenna mode mesospheric wind-profiler radar. The vertical structure of the waves at altitudes of 80-100 km shows a phase variation corresponding to a vertical wavelength of more than 100 km. The observed periods support previous interpretations, based on satellite observations and barotropic instability models, of modes associated with the "4-day" wave. (Auth. mod.)

I-49085

Angell, J.K., **Reexamination of the relation between depth of the antarctic ozone hole, and equatorial QBO and SST, 1962-1992**, *Geophysical research letters*, Aug. 6, 1993 20(15), p.1559-1562, 33 refs.

In this paper, the relation between depth of the antarctic ozone hole, and equatorial Quasi-Biennial Oscillation (QBO) and sea surface temperature (SST), is reexamined for the interval 1962-1992, using Dobson total-ozone data at the South Pole, Singapore 50 mb zonal wind, and average SST in the El Niño region 12S-2N, 180-90W. During this interval the correlation between Oct.-Nov. values of South Pole total ozone and south polar 100 mb temperature from radiosondes is 0.93. In 23 of 27 cases, South Pole springtime (Oct.-Nov.) total ozone decreased from one year to the next when the Singapore 50 mb zonal averaged from the east during the intervening 3 seasons, and increased when this wind averaged from the west. The tendency for a deeper ozone hole when equatorial SST warms (El Niño) yields a relation between depth of the antarctic ozone hole, equatorial QBO and SST, significant at the 1% level only by the subjective drawing of a smooth line which separates springtime total-ozone increases and decreases from one year to the next in 24 of 25 cases, with 2 cases on the line of separation. The Singapore 50 mb wind has been from the west during the first half of 1993, suggesting a less deep ozone hole in 1993 than in 1992, especially if the current prolonged El Niño finally abates in mid-1993. (Auth. mod.)

I-49087

Kondrat'ev, K.IA, **Global climate** [Global'nyĭ klimat], St. Petersburg, Nauka, 1992, 357p., In Russian. Refs. p.330-353.

Divided into 5 chapters, this work presents the observed climatic regularities (e.g., the carbon cycle, CO₂), a world-wide program to study the climate, basic climate forming processes (e.g., cloudiness and radiation, ocean-cryosphere processes, aerosols), internal changes

in the climatic system (including a theory on short-phase climatic changes), and external influences on the climatic system (e.g., CO₂, greenhouse effect, volcanoes). Data are included for the antarctic ice sheet and the Weddell Sea.

I-49091

Molina, M.J., **Physical chemistry of the H₂SO₄/HNO₃/H₂O system: implications for polar stratospheric clouds**, *Science*, Sep. 10, 1993 261(5127), p.1418-1423, 52 refs.

The most prevalent PSCs form at temperatures several degrees above the ice frost point and are believed to consist of HNO₃ hydrates; however, their formation mechanism is unclear. Results of laboratory experiments are presented which indicate that the background stratospheric H₂SO₄/H₂O aerosols provide an essential link in this mechanism. These liquid aerosols absorb significant amounts of HNO₃ vapor, leading most likely to the crystallization of nitric acid trihydrate (NAT). The frozen particles then grow to form PSCs by condensation of additional amounts of HNO₃ and H₂O vapor. Furthermore, reaction probability measurements reveal that the chlorine radical precursors are formed readily at polar stratospheric temperatures not just on NAT and ice crystals, but also on liquid H₂SO₄ solutions and on solid H₂SO₄ hydrates. These results imply that the chlorine activation efficiency of the aerosol particles increases rapidly as the temperature approaches the ice frost point, regardless of the phase or composition of the particles. (Auth. mod.)

I-49093

Siegenthaler, U., Sarmiento, J.L., **Atmospheric carbon dioxide and the ocean**, *Nature*, Sep. 9, 1993 365(6442), p.119-125, 85 refs.

The ocean is a significant sink for anthropogenic carbon dioxide, taking up about a third of the emissions arising from fossil-fuel use and tropical deforestation. Increases in the atmospheric carbon dioxide concentration account for most of the remaining emissions, but there still appears to be a 'missing sink' which may be located in the terrestrial biosphere. Atmospheric CO₂ measurements made from ice cores recovered at Siple and Amundsen-Scott Stations were used in the preparation of this review. (Auth. mod.)

I-49095

Gobbi, G.P., Adriani, A., **Mechanisms of formation of stratospheric clouds observed during the antarctic late winter of 1992**, *Geophysical research letters*, July 23, 1993 20(14), p.1427-1430, 16 refs.

A periodicity was observed to drive the 1992 late winter formation of stratospheric clouds over McMurdo Station. Lidar and meteorological data show that intense stratospheric coolings, accompanied by generation of clouds, resulted from the transit of air parcels proceeding from latitudes near the edge of the polar vortex. Lidar depolarization measurements show that large cloud particles could survive for several days in undersaturated air. In the event of further coolings, these particles would act as preferential growth nuclei. Depolarization measurements also indicate that most of the late winter inner vortex sulfuric acid aerosol was frozen. Periodically observed transit of vortex airmasses outside the terminator could be the cause of the wintertime ozone losses occasionally observed at the center of the continent. (Auth.)

I-49109

Chubachi, S., **Relationship between total ozone amounts and stratospheric temperature at Syowa, Antarctica**, *Journal of geophysical research*, Feb. 20, 1993 98(D2), p.3005-3010, 27 refs.

Using statistical methods, the relationship has been studied between total ozone and 100-mbar temperatures at Showa Station, based

on data obtained in 1961-1981 and 1982-1988, the time of ozone depletion in Antarctica. Results indicate a strong positive correlation between total ozone and 100-mbar stratospheric temperatures during Sep.-Mar. for all years, but lower ozone values at 100-mbar stratospheric temperatures colder than about -60 C during the 1982-1988 period. Ozone destruction by heterogeneous photochemical processes was the main cause of ozone depletion over Showa during the 1980s, with a lesser contribution from a change in air dynamics (heat, ozone, and momentum transport to Antarctica during the austral spring) that increased polar vortex stability, thereby promoting photochemical ozone depression within the vortex. (Auth.)

I-49121

Keyser, L.F., Leu, M.T., **Morphology of nitric acid and water ice films**, *Microscopy research and technique*, Aug. 1993 25(5-6), p.434-438, 16 refs.

Ice films have been used to simulate stratospheric cloud surfaces in order to obtain laboratory data on solubilities and heterogeneous reaction rates. To obtain intrinsic uptake and surface reaction probabilities which can be applied to atmospheric models, it is necessary to carefully characterize these films. In the present study, environmental scanning electron microscopy is used to study thin films of both water ice and nitric acid ice near the composition of the trihydrate. The ices are formed by vapor deposition onto aluminum or borosilicate-glass substrates cooled to about 200 K. The results show that the ice films are composed of loosely consolidated granules, which range from about 1 to 20 microns in size at temperatures between 197 and 235 K. Cubic water ice is sometimes observed at 200 K and converts to the hexagonal form at slightly higher temperatures. The loose packing of the granules confirms the high porosities of these films as obtained from separate bulk porosity measurements. The present results have important implications for the extraction of intrinsic reaction probabilities from laboratory rate data, and are relevant to the study of processes implicated in the depletion of the antarctic stratosphere. (Auth. mod.)

I-49123

Crowley, T.J., Yip, K.J.J., Baum, S.K., **Milankovitch cycles and carboniferous climate**, *Geophysical research letters*, June 18, 1993 20(12), p.1175-1178, 25 refs.

Herein are reported results from climate model simulations that examine the effect of Milankovitch insolation variations on the climate of the Gondwanan supercontinent. Utilizing maximum summer insolation values typical of interglacials, completely snow-free conditions are simulated with summer temperatures at the South Pole > 20 C. Modifying orbital configuration to minimum summer insolation receipt results in a large area of below-freezing temperatures. Comparison of model-generated summer snow cover for the later run with reconstructions of glacial ice extent indicates a good first-order agreement. These calculations support the cyclothem model, and suggest that the entire glacial-interglacial couplet for the Carboniferous can be simulated with a minimum number of adjustable parameters. (Auth. mod.)

I-49124

Saastad, O.W., Ellermann, T., Nielsen, C.J., **On the adsorption of NO and NO₂ on cold H₂O/H₂SO₄ surfaces**, *Geophysical research letters*, June 18, 1993 20(12), p.1191-1193, 14 refs.

In an experiment relevant to the attenuation of the antarctic stratosphere, a static reaction chamber attached to a mass spectrometer was employed to study the adsorption of NO and NO₂ onto cold surfaces of pure ice and liquid/solid 70 wt% H₂SO₄. No significant adsorption could be observed for surface temperatures in the range of 193-243 K and NO/NO₂ partial pressures of .01-.00001 mbar. This sets an upper limit on the uptake coefficients for both NO and NO₂ of .00005. The possible formation of nitrosyl sulphuric acid by ad-

sorption of NO and NO₂ on cold sulphuric acid particles is therefore unlikely to be of importance in the stratosphere. (Auth. mod.)

I-49125

Rosenfield, J.E., **Radiative feedback of polar stratospheric clouds on antarctic temperatures**, *Geophysical research letters*, June 18, 1993 20(12), p.1195-1198, 20 refs.

A one-dimensional time marching radiative transfer model has been used to investigate the potential effects of polar stratospheric clouds (PSCs) on winter and spring temperatures in the antarctic lower stratosphere. High, middle and low PSC amounts were specified from lidar backscatter profiles and were chosen to represent the likely range of PSC amounts present in the antarctic region. The computed effects of the PSCs on temperatures depend strongly on the surface temperature and on the extent of tropospheric cloudiness. They range from a maximum increase of 6 K for a high amount of PSCs over a warm surface and clear troposphere to a maximum decrease of 2 K for a high amount of PSCs over a cold surface and a troposphere with high clouds. The average effect is unlikely to be more than a 1 or 2 K temperature change. (Auth.)

I-49126

Roche, A.E., Kumer, J.B., Mergenthaler, J.L., **CLAES observations of ClONO₂ and HNO₃ in the antarctic stratosphere, between June 15 and September 17, 1992**, *Geophysical research letters*, June 18, 1993 20(12), p.1223-1226, 9 refs.

The Cryogenic Array Etalon Spectrometer (CLAES) on the NASA Upper Atmosphere Research Satellite (UARS) began viewing the stratosphere in Oct. 1991. This paper presents preliminary retrievals of ClONO₂ and HNO₃ from the CLAES measurements for selected days in June, July, Aug., and Sep. of 1992 for the Southern Hemisphere. The data show that by July 10, lower stratospheric ClONO₂ and HNO₃ have developed high "collar" regions surrounding the polar vortex, and low values inside the vortex. This general structure is sustained through Sep. 17, although the ClONO₂ values inside the vortex increase significantly by this date. The data suggest that substantial sequestration of gaseous HNO₃ in polar stratospheric clouds occurs in the early winter antarctic stratosphere, accompanied by the conversion of ClONO₂ to reactive chlorine through heterogeneous processes on the PSCs. (Auth. mod.)

I-49127

Tuck, A.F., Russell, J.M., III, Harries, J.E., **Stratospheric dryness: antiphased desiccation over Micronesia and Antarctica**, *Geophysical research letters*, June 18, 1993 20(12), p.1227-1230, 17 refs.

Halogen Occultation Experiment observations of water vapor and methane during the period Sep. 21-Oct. 15, 1992 are used to examine the role of antarctic drying in the lower stratosphere. Zonal mean cross-sections of [2 CH₄ + H₂O] show the probability of transport of antarctic type dryness to latitudes as distant as 20N, with major water vapor deficits evident between 10 and 100 mb to 10S. Examination of monthly mean tropical 100 mb temperatures and of antarctic temperatures suggests that the observations are consistent with stratospheric dryness being achieved by the combined effects of tropopause freeze-drying over the Micronesia region during northern winter, and drying through the influence of the very low temperatures over Antarctica during southern winter. This paper presents these new results, and offers a possible explanation. (Auth. mod.)

I-49128

Harwood, R.S., **Springtime stratospheric water vapour in the southern hemisphere as measured by MLS**, *Geophysical research letters*, June 18, 1993 20(12), p.1235-1238, 13 refs.

The effects of the break-up of the antarctic vortex on the water vapor distribution are studied using MLS (Microwave Limb Sounder) measurements of water vapor made during Sep. 1991 and Nov. 1991. In early Nov. at 22 hPa a moist area is found within the polar vortex, consistent with an observed descent of order 10 km and strong radiative cooling. As the vortex erodes (beginning of Nov. 1991), parcels of moist air become detached from the edge of the vortex and mix rapidly (within 2-3 days) with drier mid-latitude air. When the vortex breaks up (mid-Nov.), larger parcels of moist air from both the edge and the inner vortex migrate to mid-latitudes. These parcels have a longer lifetime than those produced by vortex erosion, probably because they are correlated with higher potential vorticity gradients. (Auth. mod.)

I-49129

Fisher, M., O'Neill, A., Sutton, R., **Rapid descent of mesospheric air into the stratospheric polar vortex**, *Geophysical research letters*, June 18, 1993 20(12), p.1267-1270, 8 refs.

Wind fields from a numerical simulation are used to give a detailed Lagrangian picture of air flow in the middle atmosphere of the Southern Hemisphere in winter and early spring 1991. Trajectories for many thousands of air particles exhibit rapid descent of mesospheric air into the stratospheric polar vortex, revealing its organizing and structure-preserving properties. Results are used to account for measurements of low methane concentrations in the vortex made by the HALOE (Halogen Occultation Experiment) instrument on board the Upper Atmosphere Research Satellite. (Auth. mod.)

I-49130

Manney, G.L., Zurek, R.W., **Interhemispheric comparison of the development of the stratospheric polar vortex during fall: a 3-dimensional perspective for 1991-1992**, *Geophysical research letters*, June 18, 1993 20(12), p.1275-1278, 13 refs.

The development of the stratospheric polar vortex during fall and early winter in the Northern Hemisphere (NH) during 1991-1992, and the Southern Hemisphere (SH) during 1992 is examined using National Meteorological Center data. Compared to the NH, the polar vortex in the SH developed with less variability on short time scales, deepened more rapidly and continued to expand well into winter. Daily minimum temperatures in the lower stratosphere were lowest at equivalent seasonal dates in both hemispheres, but values below the condensation temperatures of polar stratospheric clouds occurred earlier, persisted much longer, and occupied a larger volume of air in the SH. These interhemispheric meteorological differences can account for some of the key features of the chlorine monoxide distributions observed by the Microwave Limb Sounder on the Upper Atmosphere Research Satellite. (Auth.)

I-49131

Manney, G.L., **Evolution of ozone observed by UARS MLS in the 1992 late winter southern polar vortex**, *Geophysical research letters*, June 18, 1993 20(12), p.1279-1282, 10 refs.

The evolution of ozone (O₃) observed by the Microwave Limb Sounder on board the Upper Atmosphere Research Satellite is described for Aug. 14-Sep. 20, 1992, in relation to the polar vortex. The development of an ozone hole is observed in column O₃, and a corresponding decrease is seen in O₃ mixing ratio in the polar lower stratosphere, consistent with chemical destruction. The observations also suggest that poleward transport associated with episodes of strong planetary wave activity is important in increasing O₃ in the mid-stratosphere. (Auth.)

I-49132

Mergenthaler, J.L., Kumer, J.B., Roche, A.E., **CLAES south-looking aerosol observations for 1992**, *Geophysical research letters*, June 18, 1993 20(12), p.1295-1298, 19 refs.

The Cryogenic Limb Etalon Array Spectrometer (CLAES) aboard the Upper Atmosphere Research Satellite (UARS) has made global observations of stratospheric aerosol during 1992. The instrument and measurement technique are briefly discussed. Samples of CLAES aerosol observations for south-looking days through the course of the antarctic winter, showing evolution of polar stratospheric clouds (PSCs) and the Pinatubo volcanic veil, are shown and discussed. (Auth.)

I-49134

Mote, P.W., Holton, J.R., Russell, J.M., III, Boville, B.A., **Comparison of observed (HALOE) and modeled (CCM2) methane and stratospheric water vapor**, *Geophysical research letters*, July 23, 1993 20(14), p.1419-1422, 20 refs.

Recent measurements (Sep. 21-Oct. 15, 1992) of methane and water vapor by the Halogen Occultation Experiment on the Upper Atmosphere Research Satellite are compared with model results for the same season from a troposphere-middle atmosphere version of the National Center for Atmospheric Research Community Climate Model. Observed features simulated by the model include the following: subsidence over a deep layer in the Southern Hemisphere polar vortex; widespread dehydration in the polar vortex; existence of a region of low water vapor mixing ratios extending from the Antarctic into the Northern Hemisphere tropics, which suggests that antarctic dehydration contributes to mid-latitude and tropical dryness in the stratosphere. (Auth. mod.)

I-49161

Vosjan, J.H., Pauptit, E., **Penetration of photosynthetically available light (PAR), UV-a and UV-b in Admiralty Bay, King George Island, Antarctica**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.50-58, 11 refs.

During springtime the stratospheric ozone layer over Antarctica is thinning, resulting in increased UV-b radiation reaching the surface of the southern ocean. Increased UV-b penetrating the water column may influence marine ecosystems. The penetration of various forms of radiation (UV-b, UV-a and PAR) in Admiralty Bay has been studied. The attenuation of the light was measured with International Light photodetectors: the photosynthetically available radiation (PAR) detector at wavelengths between 400 and 800 nm; the UV-a detector, at wavelengths between 300 and 400 nm; and the UV-b detector, at wavelengths between 260 and 350 nm. The attenuation coefficients for PAR, UV-a and UV-b were 0.13, 0.16 and 0.26/m, respectively. The mean of the 1% depth observations for PAR, UV-a and UV-b are 35 m, 29 m and 18 m. These values are much higher than those found in other coastal areas of the world, because in Antarctica there is no river influx carrying suspended materials and humic acids, which scatter and absorb these radiations. (Auth.)

I-49183

Wang, H.J., Zeng, Q.C., Zhang, X.H., **Numerical simulation of the climatic change caused by CO₂ doubling**, *Science in China, Series B*, Apr. 1993 36(4), p.451-462, 9 refs.

The IAP two-level atmospheric general circulation model was coupled to a 60 m-deep mixed layer ocean model and a zero-layer thermodynamic model to simulate the climatic effects induced by a doubling of CO₂ concentration in the atmosphere. The global surface

temperature rise is 1.75 C when CO₂ is doubled. This value is lower than most other results, such as those of GFDL, NCAR, UKMO, GISS and OSU models. There are large regional and seasonal differences in the climatic change. Extensive warming is found in Northern Hemisphere high latitudes and in Antarctica; and the warming in land areas is greater than in ocean areas, while the precipitation increases in high latitudes and tropical regions but decreases in subtropical regions. In both hemispheres, the warming is greater in winter than in other seasons. As for the changes in China, the model shows that the precipitation in southwestern and northern China greatly decreases in summer but increases in winter. (Auth. mod.)

I-49207

Connolley, W.M., **Global climate models and Antarctica**, Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015, edited by E.M. Morris, Cambridge, British Antarctic Survey, 1992, p.25-26, 5 refs.

Global Circulation Models can be a powerful tool to investigate possible climate changes. Over data-sparse regions such as Antarctica, they may offer valuable information about the current climate. There are, however, many areas where models need to be improved, and in this paper the author considers the representation of the oceans, sea ice and steep orography, which are particularly relevant to modelling around Antarctica. (Auth.)

I-49252

Nakazawa, T., **Differences of the atmospheric CH₄ concentration between the arctic and antarctic regions in pre-industrial/pre-agricultural era**, *Geophysical research letters*, May 21, 1993 20(10), p.943-946, 31 refs.

Air samples in ice cores from Site J, Greenland and Mizuho Station were analyzed to reconstruct the past concentrations of atmospheric CH₄ at northern and southern high latitudes. The results showed that the CH₄ concentrations were fairly constant in the pre-industrial/pre-agricultural era covered by this study, average values being 756 \pm 10 and 701 \pm 10 ppbv for the Site J and Mizuho cores, respectively, and then increased significantly with time. The pre-industrial/pre-agricultural levels of the CH₄ concentration obtained from the Site J core were higher by 55 \pm 20 ppbv than those from the Mizuho core, suggesting that natural CH₄ sources in the Northern Hemisphere exceeded those in the Southern Hemisphere. (Auth. mod.)

I-49253

Crowley, T.J., Baum, S.K., **Effect of decreased solar luminosity on Late Precambrian ice extent**, *Journal of geophysical research*, Sep. 20, 1993 98(D9), p.16,723-16,732, 64 refs.

This paper presents a number of seasonal climate modeling studies to refine understanding of the changes that occurred in the Neoproterozoic, particularly the effect of decreased solar luminosity on seasonal snow extent during times of glacial inception. The specific objective is determination of the latitudinal difference in snowline extent. In addition to achieving some success in simulating the appearance and disappearance of ice, the results may have implications for understanding the biotic transition, evaluating supercontinent configurations, use of carbon isotopes as a stratigraphic tool, and the hypothetical movement of Gondwana in the vicinity of the South Pole. (Auth. mod.)

I-49254

Simmonds, I., Wu, X.R., **Cyclone behaviour response to changes in winter southern hemisphere sea-ice concentration**, *Royal Meteorological Society. Quarterly journal B*, July 1993 119(513), p.1121-1148, 46 refs.

In this paper, the sensitivity of climatological cyclone behavior in the Southern Hemisphere to reductions in winter antarctic sea-ice concentration is studied in general circulation model (GCM) experiments. An increase in the number of cyclones over most of the Weddell and Ross Seas is a response common to all cases of reduction of sea-ice concentration from 100%. There is a tendency, particularly at lower ice concentrations, for more cyclones to be found in the latitude band of about 10 to 15 deg of latitude width centered on the antarctic coast, and a belt of fewer cyclones to the north. The structure of the changes in cyclogenesis assumes a much lesser zonally oriented form, and all experiments induce enhanced cyclogenesis in the western Weddell Sea. There is generally an increase in cyclogenesis south of about 65S, although some longitudinal sectors show up as regions of decreased cyclogenesis even though the sea-ice concentration has been reduced there. This study demonstrates the utility of GCMs in the study of high-latitude cyclone sensitivity, and suggests it is a valuable tool to be used in tandem with observational-based analyses. (Auth. mod.)

I-49255

Waters, J.W., **MLS observations of lower stratospheric ClO and O₃ in the 1992 southern hemisphere winter**, *Geophysical research letters*, June 18, 1993 20(12), p.1219-1222, 9 refs.

Springtime loss of antarctic O₃ is due to enhanced chlorine chemistry triggered by processes on polar stratospheric clouds which form in the cold winter vortex. ClO, the dominant form of reactive chlorine that destroys O₃, has been observed in antarctic regions in late winter and early spring at the approximate abundances to explain the O₃ loss. This letter presents lower stratospheric ClO and O₃ measurements made in the 1992 southern winter by the Microwave Limb Sounder on the Upper Atmosphere Research Satellite. (Auth. mod.)

I-49256

Bowman, K.P., **Barotropic simulation of large-scale mixing in the antarctic polar vortex**, *Journal of the atmospheric sciences*, Sep. 1, 1993 50(17), p.2901-2914, 37 refs.

In this paper, the equivalent barotropic model of Salby et al. is used to study quasi-horizontal mixing by the large-scale flow in the lower stratosphere during Southern Hemisphere spring, which is when the antarctic ozone hole appears and disappears. The model is forced by relaxation to observed climatological monthly mean zonal-mean winds and by an idealized wave 1 or 2 forcing at the lower boundary. Mixing and transport are diagnosed primarily through Lagrangian tracer trajectories. Mixing occurs near the critical lines for the waves: in the tropics and subtropics for a stationary wave 1, and in mid-latitudes on the equatorward flank of the jet for an eastward-moving wave 2. For the December basic state, the wave 2 forcing rapidly mixes the interior of the vortex. Mixing of Lagrangian tracer particles can be significant even when the waves do not "break," as evidenced by the potential vorticity field. In the model there does not appear to be any significant transport of air out of the interior of the polar vortex prior to the vortex breakdown. The principal factor that leads to the vortex breakdown and mixing of the vortex interior is the deceleration of the jet to the point where winds in the interior of the vortex are close to the phase velocity of the wavenumber 2 forcing. (Auth. mod.)

I-49257

Bowman, K.P., Mangus, N.J., **Observations of deformation and mixing of the total ozone field in the antarctic polar vortex**, *Journal of the atmospheric sciences*, Sep. 1, 1993 50(17), p.2915-2921, 22 refs.

This paper examines Total Ozone Mapping Spectrometer (TOMS) images of the springtime Southern Hemisphere, which commonly show concentric layers in the total ozone field outside the antarctic polar vortex. The layering appears to result from horizontal

folding and stretching of regions on the equatorward flank of the polar vortex near the mid-latitude ozone maximum. This folding and stretching interleaves low and high ozone air from the subtropics and mid-latitudes, respectively. Occasional large amplitude wave events can extract very low ozone air from the interior of the polar vortex (the antarctic ozone hole), but the folding and stretching occurs in mid-latitudes even when wave amplitudes are not exceptionally large. The folding and stretching results in relatively rapid horizontal mixing of the atmosphere on the equatorward flank of the jet. This type of Lagrangian behavior may be common in the atmosphere, but is only visible when local tracer gradients are large and observations with high spatial resolution are available. Also, experimentation has shown that gray-scale images of TOMS data show the details of the spatial distribution of ozone much more clearly than contour maps or false-color images. (Auth. mod.)

I-49258

Chu, L.T., Leu, M.T., Keyser, L.F., **Uptake of HCl in water ice and nitric acid ice films**, *Journal of physical chemistry*, July 22, 1993 97(29), p.7779-7785, 41 refs.

The uptake of HCl in water ice and nitric acid ice films has been investigated under experimental conditions that may mimic the polar stratosphere. The HCl uptake in ice films at 188 and 193 K was determined to be in the range of 8.7×10^{13} to 1.8×10^{15} molecules/sq cm. On the basis of a model which accounts for the total surface area of the films, the true surface density could be a factor of 25 lower than that calculated by the geometric area. A slightly higher uptake was observed at the lower temperature of 188 K. The uptake of HCl in ice was significantly enhanced by using an HCl partial pressure greater than .00001 Torr. The observation was found to be consistent with the formation of the hexahydrate or the trihydrate of HCl according to the phase diagram of the HCl/H₂O system. The uptake of HCl in nitric acid ice at 188 K was determined to be in the range of 8.0×10^{13} to 5.3×10^{14} molecules/sq cm at HCl partial pressure of .0000045 Torr. Measurement of both HNO₃ and H₂O vapor pressures was made to positively identify the formation of nitric acid trihydrate (NAT) surface according to the phase diagram of the HNO₃/H₂O system. The HCl uptake in NAT is comparable to that in water ice in the present experiment, but significantly smaller than the previously reported values by Mauersberger et al. Implications of these results for the heterogeneous chemistry of polar ozone depletion are briefly discussed. (Auth. mod.)

I-49259

Zhang, R.Y., Wooldridge, P.J., Molina, M.J., **Vapor pressure measurements for the H₂SO₄/HNO₃/H₂O and H₂SO₄/HCl/H₂O systems: incorporation of stratospheric acids into background sulfate aerosols**, *Journal of physical chemistry*, Aug. 12, 1993 97(32), p.8541-8548, 42 refs.

In experiments which model the formation of polar stratospheric clouds, vapor pressures over aqueous H₂SO₄/HNO₃/H₂O and H₂SO₄/HCl/H₂O solutions were measured for sulfuric acid contents ranging from 35 to 75 wt % at temperatures between 190 and 230 K. From the data, the Henry's law solubility constants for both systems are determined, and the equilibrium compositions of aqueous stratospheric aerosols are predicted as a function of ambient temperature and mixing ratios of H₂O and HNO₃. The results indicate that, at the low temperatures characteristic of the stratosphere at high latitudes in the winter and spring, the HNO₃ content reaches levels of the order of 10 wt % in the background sulfate aerosols. The results also indicate that the amount of dissolved HCl in the background sulfate aerosols is small when compared with dissolved HNO₃, but may be significant for the production of Cl₂ via the heterogeneous reaction between ClONO₂ and HCl at low temperatures. (Auth. mod.)

I-49261

Périard, C., Pettré, P., **Some aspects of the climatology of Dumont d'Urville, Adélie Land, Antarctica**, *International journal of climatology*, Apr. 1993 13(3), p.313-327, 12 refs.

A climatological study over 32 years of data taken at Dumont d'Urville shows two remarkable results concerning the temperature. Firstly, one observes a warming trend of 0.26 C per decade. Secondly, there are two very contrasting seasons: summer and winter, separated by short interseasons, with the autumn longer than the spring. This pattern is explained by the thermal effect of the ocean. There are winds blowing from the sea in summer when the ocean is free of ice, which suggests the occurrence of a coast breeze, whereas the strong winds from the continent, following the direction of katabatic winds, increase when the sea-ice covers the ocean. These winds are strongest and most frequent during the season changes in Mar.-Apr. and in Aug.-Sep. The results show that the diurnal variation of the wind is mainly determined by the radiation cycle. (Auth.)

I-49265

Walker, G., **Weather contributes to record ozone loss**, *Nature*, Oct. 21, 1993 365(6448), p.683.

Instruments on a balloon launched from Amundsen-Scott Station on Oct. 6, 1993 and a Dobson spectrophotometer record of the same date both recorded Dobson Units of less than 90, the deepest ozone drop yet recorded over Antarctica. A spokesman from the Climate Monitoring and Diagnostic Laboratory concluded that a colder vortex combined with the workings of CFCs caused this deepest ozone hole in a positive feedback loop.

I-49273

Kerr, R.A., **Ozone hole reaches new low**, *Science*, Oct. 22, 1993 262(5133), p.501.

Just when scientists thought the ozone hole over Antarctica had reached its lowest depth, it gained a new low of less than 100 Dobson Units. Measurements made from a high altitude balloon launched from Amundsen-Scott Station and by a ground-based spectrophotometer showed less than 100 DU remaining over Antarctica, the lowest on record. A NASA spokesman believes that colder than normal temperatures at high altitude may have caused the formation of more than usual stratospheric cloud particles.

I-49284

Hernandez, G., Fraser, G.J., Smith, R.W., **Mesospheric 12-hour oscillation near South Pole, Antarctica**, *Geophysical research letters*, Sep. 3, 1993 20(17), p.1787-1790, 16 refs.

A 12-hour oscillation in the horizontal motion of the neutral mesosphere near the South Pole has been determined from optical measurements of the Doppler shift of the OH emission in this region of the upper atmosphere. The measurement of this wave's phase progression with longitude shows the wave to be a westward-traveling zonal wavenumber one mode. The absence of significant oscillation at this periodicity in the simultaneously measured mesospheric temperature is consistent with the zonal wavenumber one determination. Tentative assignment of this oscillation to an inertio-gravity wave has been made, based on these findings. The observation of the 12-hour periodicity oscillation as a zonal wavenumber one motion precludes its identification as a zonal wavenumber two semidiurnal tide. (Auth.)

I-49295

Dunn, R.C., **Condensed phase dynamics of OCIO**, San Diego, University of California, 1993, 134p., University Microfilms order No.93-12096, Ph.D. thesis. 33 refs.

The results of condensed-phase spectroscopic measurements aimed at understanding the properties of the photoreactive excited

states of OCIO in solution are reported. The motivation for this study stems from the role that OCIO may play in polar ozone depletion. The concentration of OCIO in the antarctic stratosphere has been measured and is found to anticorrelate with the ozone concentration during the austral spring. The link of OCIO to ozone depletion is built upon recent gas-phase studies which detected the presence of a photochemical channel leading to the generation of Cl and O₂. Prior to these studies, OCIO was not expected to lead to ozone loss as it was believed that only ClO and O were produced following excitation. As is evident from the literature, the complex photoreactivity of OCIO is affected by the surrounding environment. The photoreactivity of OCIO in a variety of solvents was studied using time-resolved absorption and emission spectroscopic techniques. In particular, for the case of OCIO dissolved in water, the results of the time-resolved experiments led to a quantitative description of the photochemistry. (Auth. mod.)

I-49296

Quintanar, I.A., **Generation mechanisms of quasi-stationary waves in the Southern Hemisphere**, Los Angeles, University of California, 1993, 147p., University Microfilms order No.93-17893, Ph.D. thesis. Refs. p.136-147.

The effect of antarctic elevations, the rest of the world orography and thermal forcing from lower latitudes on the atmospheric circulation of the Southern Hemisphere is investigated by following an approach based on the comparison of simulations using the UCLA General Circulation Model (GCM) with different prescribed surface boundary conditions. With the GCM, the author started by performing an extended control simulation and a systematic series of hypothesis-testing simulations in which orographic and surface conditions were artificially modified. In high latitudes, GCM simulations without the antarctic orography, or even with the antarctic orography rotated 180 deg around the South Pole, show a QS-wave 1 with substantial amplitude and approximately the same phase as in the control simulation with full orography. At polar latitudes, on the other hand, the local maximum in QS-1 wave 1 that is present in the observational data is only obtained in the control simulation. Previous studies with simpler models suggest that the antarctic orography can generate a stationary wave field at high and middle latitudes that has substantial pattern similarities with those observed. This is verified by using a barotropic model with both idealized and realistic representation of the antarctic orography forced by relaxation to the October zonal mean climatology. The results of the GCM simulation suggest that realistic forcings would produce amplitudes of the quasi-stationary wave field that are significantly weaker than those observed. (Auth. mod.)

I-49318

Egger, J., Wamser, C., Kottmeier, C., **Internal atmospheric gravity waves near the coast of Antarctica**, *Boundary-layer meteorology*, Oct. 1993 66(1-2), p.1-17, 8 refs.

Two gravity wave events observed at Georg von Neumayer Station are described and analyzed. Wind and temperature are recorded at a meteorological tower. Surface pressure time series are available from four sites so that quite exact evaluations of phase speed and wavelength are possible. Radiosonde ascents provide information on the structure of the atmosphere above the boundary layer. The pressure traces of both events are dominated by sinusoidal oscillations with a well-defined frequency. Related variations of wind and temperature are small during the first event (July 16, 1986) as are those of temperature on Sep. 29, 1986. However, wind oscillations are quite large during this second event. The data are interpreted in terms of linear gravity theory. It is found that linear gravity waves of frequency and phase speed as observed were able to propagate throughout the troposphere on July 16. On the basis of linear theory it is concluded that the wave of Sept. 29 was propagating on the surface inversion. (Auth. mod.)

I-49337

Tsukamura, K., **Meteorological observations at Syowa Station and Asuka Station in 1990 by the 31st Japanese Antarctic Research Expedition**, *Antarctic record*, July 1993 37(2), p.128-168, In Japanese with English summary. \$4 refs.

This paper describes the results of surface, upper air and ozone meteorological observations carried out Feb. 1, 1990 to Jan. 31, 1991 at Showa Station, surface observations from Jan. 1, to Dec. 31, 1990 at Asuka Station, and ozone observations from Nov. to Dec. 1989 on board the icebreaker *Shirase*. The principal characteristics are as follows: in July, blizzards were encountered nine times, and records of temperature and wind were broken; in Sep., the monthly mean total ozone amount was the lowest on record; surface temperatures were always low, and the monthly mean was the lowest on record; in Jan., an anomalous blizzard in summer was encountered, and the daily maximum wind speed and gust were the strongest on record in Jan. (Auth. mod.)

I-49358

Butko, A.I., **Study of ozone anomalies over the Molodezhnaya Station in the spring of 1990**, *Soviet meteorology and hydrology*, 1992 No.7, p.11-14, Translated from *Meteorologiya i gidrologiya*. 5 refs.

The ozonosphere parameters over Antarctica in 1990 are presented. The data on the total ozone over Molodezhnaya Station for 1987-1990 and data on the vertical ozone distribution are considered. The results of measurement of the thermodynamic parameters of the atmosphere obtained with meteorological rockets and satellites over Antarctica are also given and compared with the ozone data.

I-49359

Keyser, L.F., Leu, M.T., **Surface areas and porosities of ices used to simulate stratospheric clouds**, *Journal of colloid and interface science*, Jan. 1993 155(1), p.137-145, 39 refs.

This paper reports surface areas, bulk densities, and porosities of ices formed at 85 or 200 K and annealed at higher temperatures. These results give information on the morphology of the vapor-deposited ices that have been used to simulate ice clouds in the laboratory. These data can be used to obtain intrinsic reactivities of these surfaces from observed loss rates, and thus to enhance understanding of the atmospheric processes which produce polar stratospheric clouds and antarctic ozone depletion. (Auth. mod.)

I-49361

Fitzsimons, S.J., **Glacial climates in the antarctic region during the late Paleogene: evidence from northwest Tasmania: comment and reply**, *Geology*, Oct. 1993 21(10), p.958-959, 18 refs. For paper under discussion see I-47931.

This note questions the identification of Tasmanian sediments by Macphail et al as glacial, which in their paper is required to verify the early Oligocene glaciation of Tasmania. The original authors dispute Fitzsimons, and reduce the controversy to terminological differences in sediment classification.

I-49392

Creazzo, S., **Meteorological observations**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.63-78.

Meteorological data, collected on board the *Cariboo* cruising back and forth between New Zealand and the Terra Nova Bay Station during the 1989-1990 summer season, are presented. The parameters shown include date, time of day, station number and coordinates,

wind speed and direction, air temperature and pressure, and irradiation.

I-49444

Nichol, S.E., Valenti, C., **Intercomparison of total ozone measured at low sun angles by the Brewer and Dobson spectrophotometers at Scott Base, Antarctica**, *Geophysical research letters*, Oct. 8, 1993 20(19), p.2051-2054, 12 refs.

The total ozone measurements made at Scott Base with Dobson and Brewer spectrophotometers during the 1991 antarctic ozone hole season are compared. Due to the high latitude of Scott Base, these measurements were made using low-sun measurement techniques, which are considered to be less reliable and less accurate. The differences between the quasi-simultaneous total ozone measurements and the mean daily total ozone values from Dobson instrument 17 and Brewer instrument 50 are generally between $\pm 5\%$. The Dobson-Brewer differences can on occasion be as great as 10% for measurements made at airmass values between 5 and 6. The Dobson and Brewer ozone data are generally within 5% of the Total Ozone Mapping Spectrometer (TOMS) value. (Auth. mod.)

I-49446

Carleton, A.M., Carpenter, D.A., **Satellite climatology of 'polar lows' and broadscale climatic associations for the Southern Hemisphere**, *International journal of climatology*, Apr. 1990 10(3), p.219-246, Refs. p.244-246.

A climatology of polar air cloud vortices (so-called 'polar lows') is derived for the Southern Hemisphere using sets of medium resolution (5.4 km) DMSP (Defense Meteorological Satellite Program) imagery. The climatology is for the winter season (June to Sep.) and covers the 7-year period 1977-1983. Both comma cloud and spirali-form polar air signature types are considered, as identified in recent satellite studies of the Northern Hemisphere. The comma clouds dominate over a wide range of ocean latitudes, whereas the spirali-form systems occur less frequently (about 1:10 for the hemisphere), and show maximum frequencies in sea ice latitudes around mid-winter (about 1:3). Within-season variations in the locations of maximum occurrence of polar air systems are consistent with the large-scale changes in the longwaves associated with the semi-annual oscillation of surface pressures. Interannual variations in polar low occurrence for the seven winters appeared connected, at least in part, with changes in the amplitude of sea-level pressure (SLP) wavenumber one. On a seasonally averaged basis, and in most winters, there is a positive relationship between the regional extent of the antarctic sea ice, the longitudes of preferred occurrence of cold air outbreaks, and the incidence of polar lows. This effect may be enhanced just downstream of areas of strongest oceanic heat loss to the atmosphere. (Auth. mod.)

I-49448

Keir, R.S., **Are atmospheric CO₂ content and Pleistocene climate connected by wind speed over a polar Mediterranean Sea**, *Global and planetary change*, July 1993 8(1-2), p.59-68, 34 refs.

Dust and sea-salt records in polar ice cores indicate that the climate has been windier during ice ages, and therefore the rate of gas exchange between the atmosphere and ocean should be greater in glacial periods. Increased gas exchange between the atmosphere and poleward-advected sinking cold water due to higher wind speeds could make the solubility pump more efficient, and this would decrease atmospheric CO₂. To illustrate how this might contribute to atmospheric CO₂ change over the last 150 kyr, the marine Na-concentration in the Vostok ice core is used as a logarithmic proxy for relative wind speed, from which gas piston velocities relative to the present are estimated. The effect of the cold water piston velocity on atmospheric CO₂ is then calculated according to an atmosphere-

surface ocean box model. As a result, the solubility pump lowers atmospheric CO₂ about 50 ppm during oxygen isotope stages 2-4 and about 40 ppm during stages 5a-d. Unlike various nutrient rearranging mechanisms, the solubility pump produces little fractionation of carbon isotopes between the surface and deep ocean. Combining wind-induced solubility and nutrient-based effects, using $\delta^{13}C$ in deep-sea core V19-30 as a proxy of the latter, produces a record of atmospheric CO₂ which is similar to that observed in the Vostok ice core. (Auth.)

I-49450

Gray, L.J., Ruth, S., **Modeled latitudinal distribution of the ozone quasi-biennial oscillation using observed equatorial winds**, *Journal of the atmospheric sciences*, Apr. 15, 1993 50(8), p.1033-1046, 31 refs.

A simulation of precise years of the quasi-biennial oscillation (QBO) is achieved in a two-dimensional model by relaxing the modeled equatorial winds in the lower stratosphere toward radiosonde observations. The model has been run for the period 1971-90. A QBO signal in column ozone is produced in the model that agrees reasonably well with observational data from the BUV, TOMS, and SAGE II satellite datasets. The model results confirm previous indications of the importance of the interaction of the QBO with the annual cycle in the determination of the subtropical ozone anomaly. The low-frequency modulation of the subtropical ozone anomaly is now particularly clear. A link is proposed between the QBO signal in the severity of the antarctic ozone hole and the amount of ozone observed in the subtropical/midlatitude springtime maximum in the Southern Hemisphere. On the basis of this relationship, the reliability of the model as a predictor of the severity of the ozone hole is explored. A conclusion of the study is that a reliable predictor of the severity of the ozone hole must take into account the timing of the descent of the equatorial wind QBO at the equator with respect to the annual cycle and that the use, as in previous studies, of a single parameter, such as the sign of the 50-mb equatorial wind, will not be entirely reliable because it cannot do this.

I-49452

Bian, L.G., Jia, P.Q., Lu, L.H., Zhou, X.J., **Observational study of annual variations of the surface energy balance components at Zhongshan Station of Antarctica in 1990**, *Science in China*, Aug. 1993 36(8), p.976-987, 15 refs.

From Feb. 1990 to Jan. 1991, boundary layer measurements were carried out at Zhongshan Station, East Antarctica. Measurements of the surface radiative fluxes and wind, temperature and humidity profiles in the lowest 32 m in the atmospheric boundary layer were made throughout the year. The regime of the surface energy balance was analyzed based on the observed data. It was concluded that in the warm season (Nov. to Feb.) large amounts of energy are absorbed by the surface and then transported to the atmosphere in the form of sensible and latent heat, while in the cold season (Mar. to Oct.) continuous radiative cooling of the surface occurs. (Auth. mod.)

I-49494

Oglesby, R.J., **GCM study of antarctic glaciation**, *Climate dynamics*, 1989 3(3), p.135-156, Refs. p.155-156.

An atmospheric general circulation model, the NCAR CCM, has been used to investigate the possible effects of two specific tectonic mechanisms on antarctic glaciation. These mechanisms are: closing the Drake Passage (connecting South America with Antarctica), which is assumed to effectively represent an increased meridional heat transport by the ocean; and changing the elevation of Antarctica. Perpetual season (summer and winter) and seasonal cycle simulations with warmer sea-surface temperatures and no sea ice prescribed for mid- to high-latitude southern oceans have been made with both present-day (high) antarctic elevations and with low antarctic elevations (all points below 200 m). The results suggest a relatively minor role for oceanic heat transport in the formation or elimination of

antarctic glaciation. That is, under the warmer conditions inferred to have prevailed prior to the opening of the Drake Passage, conditions would still have been favorable for the maintenance of an antarctic ice-sheet. If anything, a moderate ocean warming would promote glaciation, by increasing snowfall. Lowering the elevation of Antarctica has a larger effect on the model simulations, reducing the likelihood of glacial conditions. (Auth. mod.)

See also:

A-48802 B-47703 B-48120 B-48146 B-48267 B-48268 B-48269 B-48644 B-48662 B-48808 B-48909 E-47523 E-47561 E-47611 E-47772 E-47932 E-48266 E-48285 E-48286 E-48638 E-48639 E-48977 E-49028 E-49315 F-47382 F-47443 F-47546 F-47656 F-47657 F-47706 F-47734 F-47739 F-47774 F-47781 F-47782 F-47796 F-47886 F-47945 F-47987 F-47998 F-48005 F-48015 F-48096 F-48102 F-48104 F-48110 F-48133 F-48136 F-48179 F-48180 F-48185 F-48188 F-48189 F-48261 F-48262 F-48351 F-48383 F-48444 F-48457 F-48534 F-48658 F-48682 F-48725 F-48764 F-48842 F-49057 F-49077 F-49122 F-49162 F-49189 F-49203 F-49204 F-49205 F-49206 F-49208 F-49209 F-49357 F-49425 F-49445 F-49475 F-49476 F-49477 F-49492 F-49493 F-49495 G-48942 G-49090 H-48209 J-47724 J-47756 J-47937 J-48026 J-48042 J-48302 J-48372 J-48378 J-48410 J-48479 J-48483 J-48867 J-48875 J-49096 J-49292 J-49300 K-47513 K-47589 K-47709 K-47726 K-47798 K-48097 K-48862

J. OCEANOGRAPHY

J-47430

Yang, H.F., McTaggart, A.R., Davidson, A., **Primary productivity of acrylic acid and dimethyl sulfide during a summer bloom of *Phaeocystis pouchetii* in antarctic coastal water**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.36-43, In Chinese with English summary. 9 refs.

Analysis of samples from a 15 m water column collected 10 km off the coast of Vestfold Hills in Nov. 1988, during the blooming period of *Phaeocystis pouchetii*, is reported. Water concentrations of toxin compounds, acrylic acid and dimethyl sulfide (DMS) were determined by HPLC and GC. Results show that during the bloom of *P. pouchetii* the acrylic acid concentration ranged from 0.001-0.510 micromol/l, and that of DMS from 0.003-0.588 micromol/l. Concentrations of both increased in late Dec., reaching the highest values in early Jan. and decreasing gradually after the middle of Jan. This variation in concentrations of acrylic acid and DMS corresponded with the observed variation in cell number of the unicellular algae *P. pouchetii*. It is suggested that *P. pouchetii* produced the acrylic acid and the DMS. The major acrylic acid and DMS pathway of *P. pouchetii* showed that dimethylsulfonium propionate (DMSP) is produced from amino acids (such as methionine) by successive s-methylation, de-amination and decarboxylation. DMSP is cleaved to produce acrylic acid and DMS on a one-to-one basis. (Auth. mod.)

J-47433

Sun, H.L., **Computation and statistical analysis of tidal characteristic quantities at the Great Wall Station, Antarctica**, *Antarctic research (Chinese edition)*, June 1992 4(2), p.59-62, In Chinese with English summary. 2 refs.

Based on observations from Mar. 1987 to Feb. 1988, tidal characteristic quantities at the Great Wall Station are computed and statistically analyzed. Results are illustrated and presented in tables. (Auth. mod.)

J-47434

Krysell, M., **Carbon tetrachloride and methyl chloroform as tracers of deep water formation in the Weddell Sea, Antarctica**, *Marine chemistry*, Oct. 1992 39(4), p.297-310, 27 refs.

Results of measurements of the low molecular weight halocarbons carbon tetrachloride (CCl₄) and methyl chloroform (CH₃CCl₃, 1,1,1-trichloroethane) in the Weddell Sea are reported. The results, given as sections and profiles, illustrate the deep water formation that takes place in the area. Intermediate waters with undetectable levels of both compounds make it possible to draw an upper limit to the pre-industrial atmospheric mixing ratio of carbon tetrachloride of approximately 2 parts per trillion by volume (pptv). Simple model calculations of the rate of deep water formation in this area have been carried out using the halocarbon compounds as transient tracers. Bottom water ages as low as 8-20 years are reported for the western Weddell Sea. (Auth.)

J-47438

Karl, D.M., **Grounding of the *Bahia Paraiso*: microbial ecology of the 1989 antarctic oil spill**, *Microbial ecology*, 1992 24(1), p.77-89, 21 refs.

This report represents the evaluation by a group of scientists who investigated the effects of the *Bahia Paraiso* oil spill near Arthur

Harbor. Microbial hydrocarbon oxidation potential (CO₂-14 evolved from C-14 labeled hexadecane) was detected throughout both the oil-impacted and control regions. Hexadecane was mineralized at extremely low rates (0.13-1.21 pmol/g sediment dry weight/day); microbiological turnover time exceeded 2 years. The acute effects of DFA (measured over exposure periods of 3-7 days) on the metabolic activities of sedimentary microorganisms appear to be negligible even at seawater saturation concentrations of DFA. Long-term exposure (120 days) to varying concentrations of DFA resulted in significant decreases (>90%) in total ATP, but had either no effect or a slight stimulatory effect on metabolic activity and production. In contrast to planktonic microbial communities, increasing incubation temperatures of between 0 and 30 C had a positive effect on rates of metabolism and production of sedimentary assemblages. These results may influence the overall weathering rates of hydrocarbons deposited in the intertidal and supratidal regions of Arthur Harbor and other polar regions. (Auth. mod.)

J-47446

Bryan, J.R., ed, **Descriptions of sediments recovered by the USCGC *Glacier*, USARP Operation Deep Freeze 1986: Bransfield Strait, Gerlache Strait, Marguerite Bay, Florida State University. Sediment Research Laboratory. Contribution**, Oct. 1992 No.55, 108p., Refs. p.101-106.

This volume contains descriptions of sediments obtained during the 1985-1986 austral summer cruise of the U.S. Coast Guard ice-breaker *Glacier*, which surveyed the Bransfield Strait, the Gerlache Strait and its bay and fiords, and Marguerite Bay. This is the seventh published volume of sediment descriptions of material collected by the *Glacier* in antarctic waters since 1968 (see Bryan 1992). These volumes are designed to serve the general geologic community by providing descriptive information of shallow sediments surrounding the continent of Antarctica, and also to assist geoscientists wishing to pursue more detailed studies by serving as a guide for sediment sampling. Included are a summary of the scientific objectives of the 1985-1986 cruise of the *Glacier*; a discussion of core and grab sample recovery and processing; a table and maps of station locations; an explanation of laboratory descriptive procedures; and lithologic descriptions of piston and trigger cores, bagged samples (from piston and trigger cores), and grab samples.

J-47448

Tréguer, P., Jacques, G., **Dynamics of nutrients and phytoplankton, and fluxes of carbon, nitrogen and silicon in the antarctic ocean**, *Polar biology*, Sep. 1992 12(2), p.149-162, Refs. p.159-162.

Four major functional units have been identified in the southern ocean, and the mechanisms that control the dynamics of nutrients and phytoplankton are detailed for the different sub-systems. The very productive Coastal and Continental Shelf Zone can experience severe macronutrient depletion paralleling intense diatom-dominated phytoplankton blooming at the ice edge. In the Seasonal Ice Zone, dramatic variations in the hydrological structure occur in surface waters during the spring to summer retreat of the pack-ice, changing from a well-mixed system to a stratified one within the reaches of the ice edge. Grazing activity of euphausiids limits phytoplankton biomass to a moderate level. A shift from new production to a regenerated production regime has been demonstrated during spring along with the key role played by protozoans in controlling high ammonium concentrations in the surface layers. The well-mixed Permanently Open

Ocean Zone is characterized by variable N/Si ratios in surface waters along a north-south transect. Mesoscale eddies are typical of the Polar Front Zone: significant increases in phytoplankton biomass have been reported in this frontal area. Food web and biogeochemical cycles in this subsystem are poorly documented. The question of limitation of the primary production by eolian-transported trace metals in these different subsystems is still a matter of debate, although clear iron limitation has been evidenced for offshore waters of the Ross Sea. (Auth. mod.)

J-47449

Bouquegneau, J.M., Gieskes, W.W.C., Kraay, G.W., Larsson, A.M., **Influence of physical and biological processes on the concentration of O₂ and CO₂ in the ice-covered Weddell Sea in the spring of 1988**, *Polar biology*, Sep. 1992 12(2), p.163-170, 32 refs.

In Oct. and Nov. 1988, measurements of oxygen and total dissolved inorganic carbon (TCO₂) concentrations were made in the northwestern Weddell Sea to the south and north of the marginal ice edge, in order to estimate the relative importance, regarding their variations, of both biological (photosynthesis and respiration) and physical (transport of O₂ and CO₂ by turbulent movements and by intrusion from the atmosphere) processes. In the ice-covered region, both respiration and upwelling determined the O₂ and TCO₂ variations, whilst in the open water just north of the marginal ice edge, photosynthetic activity was the most important factor controlling O₂ and TCO₂ levels. These findings underline the importance of the activity of the pelagic ecosystem in determining the concentration of O₂ and CO₂ not only in the ice-free but also in the ice-covered antarctic ocean. (Auth.)

J-47450

Fahrbach, E., Rohardt, G., Krause, G., **Antarctic Coastal Current in the southeastern Weddell Sea**, *Polar biology*, Sep. 1992 12(2), p.171-182, 15 refs.

Between Jan. and Mar. 1989 during EPOS leg 3, a hydrographic survey was carried out in the southeastern Weddell Sea on transects across the continental shelf and slope off Kapp Norvegia and Halley Bay. This data set represents oceanographic conditions during antarctic summer. Winter observations were obtained during the Winter Weddell Gyre Study in Sep. and Oct. 1989. During summer the water in the surface layer is relatively warm and of low salinity. In the area of Halley Bay exceptionally warm conditions were encountered with sea surface temperatures of nearly +1 C. Over the upper continental slope a frontal zone separates Eastern Shelf Water from Antarctic Surface Water in the near surface layer and from Warm Deep Water in the deeper layers. The horizontal pressure gradient associated with the front produces the high velocity core of the Antarctic Coastal Current. In winter Antarctic Surface Water is replaced by colder Winter Water of higher salinity. Measurements from current meters moored off Kapp Norvegia and Vestkapp are used to describe the mean features of the current field and its fluctuations. (Auth. mod.)

J-47451

Larsson, A.M., Svansson, A., **Fluxes of gases in an ice related ecosystem in the northwestern Weddell Sea**, *Polar biology*, Sep. 1992 12(2), p.183-188, 16 refs.

Measurements of temperature, salinity, inorganic nutrients, chlorophyll *a*, oxygen and total inorganic carbon dioxide were performed Oct.-Jan. 1988-1989 in the NW Weddell Sea. From the data, a time-dependent ecological model was constructed. In this paper the authors introduce the gas fluxes, mainly oxygen but also carbon dioxide, into the model work; air-sea fluxes are necessary to explain the vertical oxygen distribution. The annual development of chlorophyll, phosphate, oxygen and total inorganic carbon dioxide are computed. Hours of daylight, losses and the eddy diffusion coefficient are allowed to vary during the year with the condition that the mean total

chlorophyll at 14 selected leg 1 stations was nearly double the magnitude of that of 18 selected leg 2 stations. This yields variations consistent with the observations. Different steady-state solutions after 91 days are also tested to show effects of one selected variation at a time, for example, the eddy diffusion coefficient or the loss rate. The oxygen air-sea flux is compared to estimated fluxes by a gas transfer formula. The formula used gives a flux which is about 5 times smaller than the model flux. Fluxes of total inorganic carbon dioxide in the model computation are always directed from air to sea. (Auth. mod.)

J-47456

Bak, R.P.M., Boldrin, A., Nieuwland, G., Rabitti, S., **Biogenic particles and nano/picoplankton in water masses over the Scotia-Weddell Sea Confluence, Antarctica**, *Polar biology*, Sep. 1992 12(2), p.219-224, 28 refs.

The particle composition was studied in the ocean surface layer (20-100 m) in terms of non-living versus living particles along a transect over the Scotia Sea/Weddell Sea transition. The data are related to characteristics of the phytoplankton community and used in a Principal Component Analysis to differentiate between water masses. There was a striking change in particle community characteristics from Scotia Sea to Weddell Sea waters, especially clear at shallow depths (20 m). Total particle concentration decreased greatly moving south over the Confluence, but the proportion of living particles increased enormously. This paralleled a change in the composition of the phytoplankton community, from a bloom to a regenerating system, with a striking reduction in the prominence of non-living particles. Densities of auto- and heterotrophic nanoflagellates and bacteria reached maximal values towards the southern end of the transect. The PCA based on particle characteristics and chlorophyll *a*, POC and PON values, distinguished Scotia from Weddell Sea waters and separated shallow from deeper stations. (Auth.)

J-47458

Veth, C., Lancelot, C., Ober, S., **On processes determining the vertical stability of surface waters in the marginal ice zone of the northwestern Weddell Sea and their relationship with phytoplankton bloom development**, *Polar biology*, Sep. 1992 12(2), p.237-243, 23 refs.

Ice edge-related phytoplankton blooms following the retreating sea-ice in the marginal ice zone are frequently observed phenomena. Such blooms are generally short-lived and are followed by a strong decrease in the chlorophyll concentration towards the open ocean, generally explained by the degradation of the vertical stability. Solar heating and ice melting, which control the stability of the surface water of the northwestern Weddell Sea during sea-ice retreat in spring, were analyzed in order to relate the spatial features of the phytoplankton ice-edge bloom in 1988 to the density field. Solar heating has little effect on the density of seawater in ice-covered areas because the thermal expansion coefficient is very low near to the freezing temperature. Outside the marginal ice zone, the temperature effect on stratification increases and the combined contribution of melting and heating on buoyancy input to the surface layer is roughly constant. As a consequence, the low phytoplankton stocks in the open ocean adjacent to the marginal ice zone, after an initial bloom peak following the retreating ice in spring, are not necessarily caused by deep turbulent mixing, in contrast to what is often assumed. (Auth.)

J-47459

Kristiansen, S., Syvertsen, E.E., Farbro, T., **Nitrogen uptake in the Weddell Sea during late winter and spring**, *Polar biology*, Sep. 1992 12(2), p.245-251, Refs. p.250-251.

Uptake rates of ammonium, nitrate and urea were measured during the EPOS leg 1 cruise to the Weddell Sea in Oct.-Nov. 1988 using the isotope N-15. Nitrate was the most important nitrogen source both for ice algae (f-ratio equal to or greater than 0.88) and for phyto-

plankton in the water column (f-ratio equal to or greater than 0.85). Indications of a gradual decrease in % new production with time were found in the outer marginal ice zone. Nitrogen uptake rates in ice algae from the sub-ice assemblages were light-limited at *in situ* irradiances. Significant regeneration of ammonium was found in ice algal samples only. (Auth.)

J-47460

Cadée, G.C., **Organic carbon in the upper layer and its sedimentation during the ice-retreat period in the Scotia-Weddell Sea, 1988**, *Polar biology*, Sep. 1992 12(2), p.253-259, Refs. p.258-259.

The maximum of particulate organic carbon (POC) in the surface layer (200-400 micrograms/l) followed the retreating ice from end Nov. to end Dec. In the upper 150 m dissolved organic carbon (DOC) amounted to 10-20 times the POC content. Free floating sediment traps at 150 m showed a daily sedimentation of 0.6-11.6% of the standing stock of POC, 0.1-2.6% of the chlorophyll-*a* and 5-190% of the gross primary production. Maximum sedimentation occurred during grazing of a krill swarm, indicating the important role of krill swarms in the downward flux. Also at most other stations krill faecal strings formed a large part of the downward flux.

J-47571

Killworth, P.D., **Equivalent-barotropic mode in the Fine Resolution Antarctic Model**, *Journal of physical oceanography*, Nov. 1992 22(11), p.1379-1387, 12 refs.

Both the 6-year time-mean flow and the eddy kinetic energy in the Fine Resolution Antarctic Model are found to be approximately self-similar in the vertical, with the velocity showing a rapid decay with depth. A simple argument is given as to why this would be expected to occur in this and other numerical models, and an analysis is given as to the degree of steering of the mean flow by topography. (Auth.)

J-47603

Perissinotto, R., Laubscher, R.K., McQuaid, C.D., **Marine productivity enhancement around Bouvet and the South Sandwich Islands (Southern Ocean)**, *Marine ecology progress series*, Oct. 29, 1992 88(1), p.41-53, Refs. p.51-53.

Selected physico-chemical and biological properties were compared between shelf and deep oceanic waters in the vicinity of Bouvet and the South Sandwich Is. during the austral summers of 1982-1983 and 1990-1991. On 3 of these occasions circuminsular chlorophyll *a* levels were 3 to 7 mg chl *a*/cu m, an increase of 3 to 4 times over off-shore stations. At South Sandwich in 1990-1991 high phaeopigment levels indicated senescence of the phytoplankton bloom, and primary production on this occasion was not markedly greater than in off-shore waters. On 2 occasions high chlorophyll concentrations were associated with a marked increase in production. This combination of high chl *a* and production levels was associated with depletion of dissolved nutrients. Size fractionation during summer 1990-1991 indicated dominance by netphytoplankton at Bouvet and by nanoplankton at South Sandwich. Sharp drops in temperature and salinity over the island shelves, and spatial covariance between upper mixed layer depth and chl *a* concentration, suggest that stabilization by meltwater may be the main cause of phytoplankton bloom formation. The present and published data suggest a longitudinal trend of decreasing phytoplankton production from Antarctic Peninsula archipelagos to islands in the Indian Ocean sector of the southern ocean. This may have implications for the estimation of total carbon flux in antarctic waters. (Auth. mod.)

J-47614

Italy. Programma Nazionale di Ricerche in Antartide, **Antarctic Project: environmental impact. Collection of publications Jan. 1986-July 1991** [Progetto Antartide: settore impatto ambientale. Raccolta pubblicazioni gennaio 1986-luglio 1991], Rome, ENEA, [1991], 296p., Refs. passim. For selected papers see E-47616 and J-47615.

This is a collection of papers dealing with environmental impact in Antarctica; some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Programme and have been published in national journals. The aim of the collection is to simplify the access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. (Auth.)

J-47615

Capodaglio, G., Scarponi, G., Cescon, P., **Lead contamination of seawaters with different anthropic influence**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore impatto ambientale. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: environmental impact. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.15-19, Reprinted from the proceedings of the International Conference on Environmental Contamination, 3rd, Venice, Italy, Sep. 1988, p.405-407. 7 refs.

Titration of seawater samples with lead were followed by anodic stripping voltammetry (ASV) to study the metal complexation in geographical areas differently affected by anthropogenic action (the Lagoon of Venice, the Ross Sea, and the eastern North Pacific). Total lead concentration measured in the Venetian Lagoon water (150-570 pM) is much higher than that observed in samples collected in the Ross Sea and eastern North Pacific (17-49 pM). A similar trend is observed for the ligand concentration, and as a consequence, the labile fraction is relatively low also in the Lagoon water (25-140 pM). (Auth.)

J-47660

Italy. Programma Nazionale di Ricerche in Antartide, **Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991** [Progetto Antartide: settore oceanografia. Raccolta pubblicazioni gennaio 1986-luglio 1991], Rome, ENEA, [1991], 276p., Refs. passim. For selected papers see E-47663, J-47661, J-47662 and J-47664.

This is a collection of papers dealing with antarctic oceanography; some of them are abstracts prepared for meetings. They report on research performed within the framework of the Italian Antarctic Program and have been published in national and international journals. The aim of the collection is to simplify the access to this scientific literature, made difficult by the elapsed time from the publication date, the limited number of copies still available and their different places of origin. A chronological list has been provided. (Auth. mod.)

J-47661

Innamorati, M., Mori, G., Catalano, G., Benedetti, F., **Phytoplankton distribution and environmental factors in Terra Nova Bay** [Distribuzione della biomassa fitoplanctonica in rapporto ai fattori ambientali nel mare di Ross—Baia di Terranova, Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore oceanografia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.27-86, In Italian. Reprinted from Università di Firenze, 1989, Resoconti dei rilevamenti in mare No.4, 58p. 7 refs.

Oceanographic and biological data, obtained in Terra Nova Bay from Dec. 20, 1987 to Feb. 29, 1988 on board the *Polar Queen*, are discussed; the corresponding tables and charts are presented. They include bathymetric profiles of temperature, salinity and dissolved oxygen, as well as those of the chemical composition, relative fluorescence, and particle density of sea water.

J-47662

Boldrin, A., Gouleau, D., Rabitti, S., Rohardt, G., **47W Transect: oceanography, suspended matter, and distribution of silicate and ammonium**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore oceanografia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.96-101, Reprinted from *Berichte zur Polarforschung*, 1990, 68, p.21-26.

The main aim of the program for EPOS leg 3 activity on Transect 47W was to obtain an oceanographic description of the same area in all three legs of the EPOS program, to follow the variations in oceanographic parameters from the start to the end of the antarctic summer (from Oct. 1988 to Jan. 1989), and to relate biological, physical and chemical characteristics of waters at the Scotia-Weddell confluence. Preliminary results are given.

J-47664

Rabitti, S., Boldrin, A., **Suspended matter and oxygen**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore oceanografia. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.109-120, Reprinted from *Berichte zur Polarforschung*, 1990, 68, p.51-62.

According to the distribution of physical properties of water, the Eastern Shelf Water, Winter Water, Modified Deep Water and Warm Deep Water are recognizable at the Halley Bay transect. Preliminary vertical distributions of oxygen and particle contents, both in the shelf and oceanic domains, are reported. At the Kapp Norvegia transect, distributions of particulate matter in numbers and oxygen content are illustrated. Taking into account the distributions inferred by these properties, the first three stations close to the ice shelf show a homogeneous water column down to a depth of 200 m. This structure is probably due to the effects of strong easterly winds (up to 12 Beaufort) occurring for at least three days before and during the sampling. In both transects Warm Deep Water is present, and it presents the same characteristics: low particle concentration and low oxygen content. At the bottom, transition waters showed the same relative increase both in suspended matter and in oxygen values, but it was more evident at the Halley Bay transect than at Kapp Norvegia.

J-47723

Brenner, A.C., Koblinsky, C.J., Zwally, H.J., **Postprocessing of satellite altimetry return signals for improved sea surface topography accuracy**, *Journal of geophysical research*, Jan. 15, 1993 98(C1), p.933-944, 19 refs.

This study analyzes retracked southern ocean data from the first 34 repeat cycles of the Geosat Exact Repeat Mission (ERM), covering Nov. 1986 through Apr. 1988. The final data set consists of over 2.5 million smoothed one-per-second measurements of the ocean surface. The significant wave height (SWH) distribution as given on the NOAA geophysical data records (GDRs) for these measurements peaks at around 2.1 m (19% of the measurements) and drops down almost linearly to 2% of the measurements at 5.8 m. There are over 1100 observations with SWH greater than 15 m. A map of the sea surface height variability of the southern ocean created using the retracked data shows differences from variability maps created using the unretracked data in regions of high wave heights. Retracking can be done efficiently on modern UNIX work stations at 0.064 times real-time acquisition. This study shows that retracking will improve altimeter precision. (Auth. mod.)

J-47724

Matano, R.P., Philander, S.G.H., **Heat and mass balances of the South Atlantic Ocean calculated from a numerical model**, *Journal of geophysical research*, Jan. 15, 1993 98(C1), p.977-984, 25 refs.

The general circulation model of Bryan (1969), modified by the introduction of open boundary conditions at the Drake Passage and between Africa and Antarctica, has been used to study the mass and heat budgets of the South Atlantic Ocean. The model was initialized with the climatological annual mean values of temperature and salinity of Levitus (1982) and forced at its surface with the climatological wind stress data of Hellerman and Rosenstein (1983). After 3 years of integration the model reached a quasi-stationary state. A heat balance shows that the model transports 0.19 PW of heat toward the north across 30S. While a large part of this heat is supplied by the atmosphere and involves the conversion of intermediate waters into surface waters, a comparison with climatological data of atmospheric heat fluxes suggests that an extra source of heat is necessary to maintain the northward heat flux. (Auth.)

J-47751

Chambers, S.R., **Geochemical studies of sediments and interstitial waters from the Kerguelen Plateau and Prydz Bay, Antarctica**, Stanford University, 1991, 226p., University Microfilms order No. 92-05607, Ph.D. thesis. Refs. passim.

This dissertation comprises most of what is known about low-temperature geochemical cycling in Prydz Bay and the Kerguelen Plateau. Sediment and interstitial water samples were collected during Leg 119 of the Ocean Drilling Program and analyzed with a variety of chemical, mineralogical, and isotopic techniques to quantify the chemical exchanges between marine waters and solid crustal components beneath the seafloor. In Prydz Bay, highly compacted glacial sediments provide barriers to the vertical diffusion of solutes in pore waters. Extensive erosion associated with glacial advances has limited the amount of marine organic matter incorporated into sediments on the continental shelf. On the Kerguelen Plateau, variations in the concentrations of major cations in pore waters are the result of reactions involving volcanic matter in the sediments and/or basement. Strontium concentrations of interstitial waters increase with depth as a result of the recrystallization of calcium carbonate. Chemical and isotopic analyses indicate equilibrium between solid carbonates and their coexisting pore fluids below 250 mbsf at one of the sites. (Auth. mod.)

J-47752

Charles, C.D., **Late Quaternary ocean chemistry and climate change from an antarctic deep sea sediment perspective**, New York, Columbia University, 1991, 199p., University Microfilms order No. 92-02658, Ph.D. thesis. Refs. passim.

Analysis of deep sea sediment cores from the Atlantic and Indian sectors of the southern ocean reveals significant changes in its chemistry and circulation over the last 450 kyr. The possible causes and effects of these changes are considered to assess the role of the southern ocean in Late Quaternary climate change. One aspect involves calibration of the isotopic composition of *Neogloboquadrina pachyderma*, the dominant species of foraminifera in southern ocean sediments. Specific mechanisms for the link between North Atlantic Deep Water and climate involving southern ocean Surface Waters are tested. Biogenic opal burial rate records suggest a decrease in antarctic surface productivity during the last few glacial periods, probably in response to the expansion of southern ocean sea ice. (Auth. mod.)

J-47756

Kennett, J.P., ed, Warnke, D.A., ed, **Antarctic paleoenvironment: a perspective on global change. Part one**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, 384p., Refs passim. For individual papers see E-47758 through E-47763, E-47772, E-47773, F-47771, F-47757 and J-47764 through J-47770.

This is the first of two volumes in the American Geophysical Union's Antarctic Research Series to present contributions that deal with the paleoenvironmental and biotic evolution of the antarctic region. The papers are based on work presented at a conference held at the University of California, Santa Barbara, Aug. 28-31, 1991, entitled "The Role of the Southern Ocean and Antarctica in Global Change: An Ocean Drilling Perspective." Following a contribution that provides plate tectonic reconstruction of the antarctic region during the last 200 m.y. and related paleoenvironmental implications, the volume is organized so that the papers are presented in general order of geologic age, beginning with the Late Cretaceous and ending with the modern antarctic ocean. This arrangement was selected to help emphasize the evolution of the antarctic environmental and biotic system during the late Phanerozoic. Two of the contributions deal with the Late Cretaceous, 7 emphasize the Paleogene, and 7 the Neogene through modern antarctic ocean. Of the proxies employed for interpretation of the paleoenvironmental record, 8 of the contributions have used sediments, 7 have used the fossil record, and one paper is an interpretation of the stable isotopic record.

J-47757

Lawver, L.A., Gahagan, L.M., Coffin, M.F., **Development of paleoseaways around Antarctica**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.7-30, Refs. p.29-30.

The earliest seaway around the present-day margin of Antarctica developed during the Late Jurassic along the western part of Queen Maud Land, and may have included part of the Weddell Sea margin of the Antarctic Peninsula. The next significant change occurred about 130 Ma, with the opening of the South Atlantic and rifting of India from East Antarctica. Circulation of deep water into the South Atlantic was blocked by the Falkland Plateau, and open deepwater circulation between India and Antarctica was blocked by Sri Lanka. The Falkland Plateau cleared the southern tip of Africa about 100 Ma. Slow spreading between Australia and Antarctica, and a complicated spreading regime between various New Zealand plates, may have opened a seaway as early as 80 Ma. However, major circulation was probably delayed until as late as 40 Ma, when Tasmania and the South Tasman Rise finally cleared north Victoria Land. The final barrier

to circumpolar circulation was in the region of southern South America and the northern Antarctic Peninsula. There, various continental fragments may have partially blocked Drake Passage until the Miocene. General cooling of the world's oceans accompanied early Tertiary opening between Australia and Antarctica and the later opening of Drake Passage. (Auth. mod.)

J-47764

Thomas, E., **Cenozoic deep-sea circulation: evidence from deep-sea benthic foraminifera**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.141-165, Refs. p.159-165.

Three periods of turnover in deep-sea benthic foraminiferal assemblages can be recognized in Cenozoic sequences: rapid global extinction in the latest Paleocene, followed by migration and diversification; gradual turnover in the late middle Eocene through early Oligocene, characterized by a decrease in diversity, a decrease relative abundance or disappearance of *Nuttallides truempyi* followed by its extinction, and a decreasing relative abundance or disappearance of *Bulimina* species in the lower bathyal to upper abyssal zones; and gradual turnover in the late early through middle Miocene, characterized by the decrease in relative abundance or disappearance of uniserial species from the lower bathyal to abyssal reaches, the migration of miliolid species into these regions, and the evolution of *Cibicidoides wuellerstorfi*. The rapid mass extinction (35-50% of species) of deep-sea benthic foraminifera in the latest Paleocene was coeval with a transient 1-2 per mill decrease in oxygen and carbon isotope ratios in benthic as well as planktonic foraminifera, superimposed on longer-term changes. The extinction could have resulted from a shift in dominant deepwater formation from high to low latitudes. (Auth. mod.)

J-47765

Oberhänsli, H., **Influence of the Tethys on the bottom waters of the Early Tertiary ocean**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.167-184, Refs. p.182-184.

In this paper the role of Tethys as a bottom water source area is evaluated using the basin/shelf distribution and climatic reconstructions from coastal and adjacent continental settings. Palinspastic maps schematically document plate tectonic changes during Paleocene through Eocene. Lithofacies patterns of the Tethyan shelf and adjacent continental areas are compiled for four early Tertiary time slices (Paleocene, Ypresian, Lutetian, and Priabonian). For this type of study, spatial and temporal distributions of sediments with a high potential for paleoclimatic interpretation such as coal, bauxite, gypsum, and halite are particularly useful. Evaporite distribution indicates excess evaporation over a large area in the eastern Tethys during the Ypresian. As a result, surface waters became more saline with potential for transformation into bottom waters. Significant amounts of warm saline bottom water were exported during the Ypresian, probably preferentially in the direction of the Indian Ocean, which then successively filled the deep basins of the world oceans. (Auth. mod.)

J-47766

Diester-Haass, L., **Late Eocene-Oligocene sedimentation in the antarctic ocean, Atlantic sector (Maud Rise, ODP leg 113, site 689): development of surface and bottom water circulation**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.185-202, Refs. p.201-202.

Variations in opal and planktonic foraminifera accumulation rates in sediments from Ocean Drilling Program Site 689 on Maud Rise indicate that at least 18 "productivity" cycles of 400-500 kyr are present in the Oligocene sediments and 2 cycles in the investigated part of the late Eocene. Accumulation rates of planktonic foraminifera are low, and their tests are easily dissolved during high-productivity periods, because of the high supply of organic matter. Clastic material is present only in high-productivity periods. Cyclic cooling-warming with a period of 400-500 kyr in the antarctic area and related cyclic sea level changes are assumed to be responsible for these sedimentological changes. In 4 short periods of roughly 100-400-kyr duration (28-28.1, 29.1-29.2, 33.6-34, and 38-38.4 Ma) excellent carbonate preservation occurred in spite of high productivity in surface waters. This is tentatively attributed to the presence of warm saline deep water (WSDW). Intense carbonate dissolution during three periods (31-32, 34.4-35, and 37-38 Ma), in spite of low productivity, is attributed to the presence of antarctic bottom water (AABW) in the area. The study suggests that in the late Eocene-Oligocene, a four-layered ocean existed in the Weddell Sea area, with AABW, WSDW, antarctic intermediate water, and a surface water layer, and that these water masses shifted vertically and latitudinally during the Oligocene. (Auth.)

J-47767

Rack, F.R., Pittenger, A., **Geotechnical stratigraphy of Neogene sediments: Maud Rise and Kerguelen Plateau**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.203-230, Refs. p.229-230.

The dominant feature of pelagic sediment accumulation patterns at intermediate water depths in the southern ocean is the sequential northward migration and replacement of a calcareous ooze sedimentary facies by a siliceous ooze facies, following the late Oligocene opening of Drake Passage and the subsequent initiation of the Antarctic Circumpolar Current. Discrete measurements of physical properties (density, porosity, and water content) and continuous whole-core measurements of bulk density and acoustic compressional velocity are evaluated for 6 sites drilled in the southern ocean on submarine rises in open ocean (pelagic) depositional environments south of the Polar Front, a major oceanographic and sedimentologic boundary. At least 6 middle to late Miocene dissolution or productivity events are identified in an accumulation of nannofossil ooze on Maud Rise; others are noted at the ODP sites in the Raggatt Basin and on the southwestern flank of the Kerguelen Plateau. An understanding of the possible interactions between the Antarctic Circumpolar Current system and seafloor topography, as modified by progressive plate tectonic motions and glacio-eustatic fluctuations, is used to develop a hypothesis for explaining the observed sediment accumulation patterns at intermediate water depths of the southern ocean during the Neogene. (Auth. mod.)

J-47768

Anderson, J.B., Bartek, L.R., **Cenozoic glacial history of the Ross Sea revealed by intermediate resolution seismic reflection data combined with drill site information**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.231-263, Refs. p.262-263.

Intermediate resolution seismic reflection profiles, in conjunction with existing Deep Sea Drilling Project Leg 28 sites, provide a record of ice sheet grounding episodes on the Ross Sea continental shelf. By Late Oligocene-Early Miocene time, the shelf was deeply scoured by grounded ice sheets resulting in a foredeepened topography. Several widespread unconformities separate Middle and Late Miocene strata from Pliocene-Pleistocene strata. During the Pliocene-Pleistocene the frequency of ice sheet grounding events increased; at least 7

grounding episodes are recognized in the eastern Ross Sea. In the western Ross Sea the increased frequency of grounding resulted in the amalgamation of erosional surfaces such that the Pliocene-Pleistocene section is incomplete, except perhaps on the outer shelf. The increased frequency of grounding on the shelf is believed to have been in response to higher-frequency eustatic changes caused by expansion and contraction of Northern Hemisphere ice sheets, and possibly the East Antarctic ice sheet. All of the seismic units recognized in this study can be sampled by shallow drilling when coupled with the seismic data. (Auth. mod.)

J-47769

Hodell, D.A., Venz, K., **Toward a high-resolution stable isotopic record of the southern ocean during the Pliocene-Pleistocene (4.8 to 0.8 Ma)**, *American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.265-310, Refs. p.308-310.

A near-continuous stable isotopic record is reported for the Pliocene-Pleistocene (4.8-0.8 Ma) from Ocean Drilling Program Site 704 in the subantarctic South Atlantic. During the early to middle Pliocene (4.8-3.2 Ma), variation in $\delta^{18}O$ was less than 0.5 per mill and absolute values were generally less than those of the Holocene. These results indicate some warming and minor deglaciation of Antarctica during intervals of the Pliocene, but are inconsistent with scenarios calling for major warming and deglaciation of the antarctic ice sheet. The climate system operated within relatively narrow limits prior to 3.2 Ma, and the antarctic cryosphere probably did not fluctuate on a large scale until the late Pliocene. Benthic oxygen isotopic values exceeded 3 per mill for the first time at 3.16 Ma. The amplitude and mean of the $\delta^{18}O$ signal increased at 2.7 Ma, suggesting a shift in climate mode during the latest Gauss. The greatest $\delta^{18}O$ values of the Gauss and Gilbert chrons occurred at 2.6 Ma, just below a hiatus that removed the interval from 2.6 to 2.3 Ma in Site 704. These results agree with those from subantarctic Site 514, which suggests that the latest Gauss (2.68 to 2.47 Ma) was the time of greatest change in Neogene climate in the northern antarctic and subantarctic regions. (Auth. mod.)

J-47770

Warnke, D.A., **Miocene-Pliocene antarctic glacial evolution: a synthesis of ice-rafted debris, stable isotope, and planktonic foraminiferal indicators**, *ODP Leg 114, American Geophysical Union. Antarctic research series*, 1992 Vol.56, Antarctic paleoenvironment: a perspective on global change. Part one. Edited by J.P. Kennett and D.A. Warnke, p.311-325, Refs. p.323-325.

Sedimentary, planktonic foraminiferal, and stable isotope data were combined from Ocean Drilling Program Leg 114 drill sites (subantarctic South Atlantic) to outline the Neogene evolution of antarctic glaciation as seen from these sites. No ice-rafted debris (IRD) was observed in the Oligocene sequence. Ice-rafted debris first reached Site 699 at about 23.5 Ma, located just south of the present-day Polar Front Zone (PFZ). Small amounts of IRD reached the site intermittently through the Miocene. At other sites, IRD first arrived at 8.8 Ma. The latest Miocene (Chron 6) carbon shift is well documented at Site 704, located north of the present-day PFZ. The shift occurred during a time of relative climatic warmth, although fluctuations are clearly discernible. During this time, circulation changes occurred, causing the transfer of large volumes of organic carbon to the ocean. The early Pliocene was a time of general global warmth (although the amount of warming that occurred in the Antarctic is in dispute), yet widespread ice-rafting episodes did occur. One interpretation of these relationships is that the "snow gun" was active, i.e., that warmer temperatures led to higher precipitation rates on Antarctica. (Auth. mod.)

J-47862

Amos, A.F., Helbling, E.W., Holm-Hansen, O., **AMLR program: Physical and biological measurements over a frontal zone close to the continental shelf break**, *Antarctic journal of the United States*, 1991 26(5), p.188-190, 7 refs.

One of the major areas for commercial harvesting of krill (*Euphausia superba*) is the region north of Elephant I. The factors responsible for the high krill density in this area are investigated. Because phytoplankton biomass also has been reported to increase near the continental shelf break and in frontal zones, one of the objectives in the AMLR program was to see if krill distribution and abundance are correlated with the distribution of phytoplankton biomass. Preliminary analysis of the continuous data from the ship's clean water intake are shown. Results will be analyzed with the data from the other AMLR research components to determine the significance of the floristic changes in regard to krill distribution and grazing preferences, and to the hydrological differences between the waters on either side of the front.

J-47871

Amos, A.F., Lavender, M.K., **AMLR program: Water masses in the vicinity of Elephant Island**, *Antarctic journal of the United States*, 1991 26(5), p.210-213, 8 refs.

As part of the U.S. Antarctic Marine Living Resources (AMLR) program the relationship between krill distribution and the structure of the upper waters in the vicinity of Elephant I. were studied. The water mass descriptions are as follows: Type 1. Drake Passage water; warm, low-salinity water at the surface, a strong subsurface temperature minimum "Winter Water," approximately -1 C in temperature. Type 2. A transition water; temperature minimum near 0 C, isopycnal mixing below the temperature minimum, Circumpolar Deep Water evident at some locations. Type 3. Possibly the western edge of Weddell-Scotia Confluence water. Type 4. Eastern Bransfield Strait water; almost straight-line relationship in temperature/salinity space. Deep temperature near -1 C. Type 5. Weddell Sea surface water, found only in the southeastern part of the study area in 1990. Water column well mixed, surface-to-bottom, surface temperature near 0 C. The water column is also well-mixed in the summer on the Elephant I. group shelves and might constitute a separate water mass. Possibly two other types may exist in the region but are not included in this preliminary classification.

J-47880

Stramma, L., **South Indian Ocean Current**, *Journal of physical oceanography*, Apr. 1992 22(4), p.421-430, 29 refs.

In this paper, the historical hydrographic database for the south Indian Ocean is used to investigate (i) the hydrographic boundary between the subtropical gyre and the Antarctic Circumpolar Current (ACC), the subtropical front (STF), and especially (ii) the southern current band of the gyre. A current band of increased zonal speeds in the upper 1000 m is found just north of the STF in the west near South Africa and at the surface STF in the open Indian Ocean until the waters off the coast of Australia are reached. As neither any other investigation of this current nor a name for it are known, the flow has been called the South Indian Ocean Current (SIOC). This name is analogous to the same current band in the South Atlantic Ocean, the South Atlantic Current. The STF is located in the entire south Indian Ocean near 40S. The associated current band of increased zonal speeds is the SIOC, which is found at or north of the STF. East of 100E the SIOC separates from the STF and continues to the northeast. The zonal flow south of the STF is normally weak and serves to separate the South Indian Ocean and Circumpolar currents.

J-47937

Klinck, J.M., **Effects of wind, density, and bathymetry on a one-layer Southern Ocean model**, *Journal of geophysical research*, Dec. 15, 1992 97(C12), p.20,179-20,189, 27 refs.

Steady solutions from a one-layer, wind-driven, primitive equation model are analyzed to determine the importance of wind forcing, pressure gradient force due to the climatological density distribution and bottom form drag on circulation in the southern ocean. Five simulations confirm previous speculation (Munk and Palmén, 1951) that form drag is effective in balancing the driving force due to the surface wind stress. Analysis of the zonally integrated momentum in the unblocked latitudes of the southern ocean shows that the bottom form drag balances the surface forcing, even for simulations that have viscosities that are in the upper range of acceptable values. The vertically integrated pressure gradient due to the climatological density distribution produces a body force that accelerates the Antarctic Circumpolar Current, producing a transport of about 250 million cu m/s. Therefore the pressure gradient produced by the density structure of the southern ocean is an integral part of the dynamics of the Antarctic Circumpolar Current. It forces the flow across bathymetry that would, in the absence of the spatially varying density field, block the circulation. This result is in contrast to mid-latitude gyres in which the steady wind-driven circulation is insulated from the influence of bathymetry by stratification. (Auth. mod.)

J-47953

McPhee, M.G., **Strategies for estimating turbulent fluxes in polar ocean boundary layers**, Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992, Boston, American Meteorological Society, 1992, p.J49-J52, 5 refs. Joint paper with the 10th Symposium on Turbulence and Diffusion.

Two methods for indirect estimation of ice/ocean stress and heat flux from unmanned ice buoys are suggested from direct flux measurements made in the under-ice boundary layer. The first infers the interfacial stress from the variance of horizontal velocity, and utilizes the freezing constraint at the ice/ocean interface to express heat flux as proportional to the product of friction velocity and the difference between mixed layer temperature and freezing temperature. This approach is currently being tested with a buoy cluster in the Weddell Sea. The second applies the inertial-dissipation method using vertical velocity and temperature spectra.

J-48026

Mammone, K.A., **Modern particle flux and productivity in Andvord Bay, Antarctica**, Clinton, Hamilton College, 1992, 98p., B.A. thesis. Refs. p.89-98.

A sediment trap mooring was deployed in Andvord Bay on Oct. 15, 1991 and retrieved on Mar. 26, 1992. Total sediment flux, ice-rafted debris flux and biogenic flux (total organic carbon and biogenic silica) were determined for traps at depths of 230, 397, and 441 m. Results were used to examine the relationship between primary productivity and related climate within the fjord environment and to help determine a sediment source model for Andvord Bay. Sediments from the trap were found to be rich in both organic carbon (3-5 wt%) and biogenic silica (23-31 wt%). The biogenic flux, an indirect measurement of primary productivity, of Andvord Bay has been determined to be significantly higher than in other areas of the Antarctic. When compared with a previous study of productivity as preserved in a sediment core conducted in Andvord Bay, the modern biologic flux is characteristic of a climate and productivity similar to that found approximately 2,700 years B.P. (Auth. mod.)

J-48030

Kumar, N., Gwiazda, R., Anderson, R.F., Froelich, P.N., **Pa-231/Th-230 ratios in sediments as a proxy for past changes in southern ocean productivity**, *Nature*, Mar. 4, 1993 362(6415), p.45-48, 37 refs.

The biological productivity of the oceans is sensitive to changes in climate, which can affect essential factors such as nutrient and light availability. In turn, ocean productivity may influence climate by regulating the partitioning of carbon dioxide between the ocean and the atmosphere. Investigators have attempted to link variations in atmospheric CO₂ content recorded in ice cores to the productivity of the southern ocean, but an unambiguous means of assessing past changes in ocean productivity has been lacking. Established relationships between Pa-231/Th-230 ratios and particle flux are used to infer, from the analysis of dated sediment cores, variability through time of fluxes of particulate biogenic material exported from surface waters. Records from two cores in the Atlantic sector of the southern ocean indicate that ocean productivity during glacial periods was lower than at present south of the antarctic polar front, and they support earlier conclusions that the zone of maximum productivity migrated northwards during glacial conditions. Although further work at other sites is needed for an assessment of changes in total antarctic productivity, this technique has the potential to provide such information while avoiding some of the limitations of other productivity proxies. (Auth.)

J-48041

Comiso, J.C., McClain, C.R., Sullivan, C.W., Ryan, J.P., Leonard, C.L., **Coastal zone color scanner pigment concentrations in the southern ocean and relationships to geophysical surface features**, *Journal of geophysical research*, Feb. 15, 1993 98(C2), p.2419-2451, 66 refs.

This study evaluates the large-scale spatial, seasonal and interannual distributions of pigment concentrations in the entire southern ocean using all available data derived from the coastal zone color scanner (CZCS) (1978-1986 [Feldman et al., 1989]). The influence of geophysical parameters in the ocean on spatial distributions of pigment also is studied using monthly mean pigment fields generated from the data and mapped onto a polar grid common with those of ancillary surface data sets. Results from regression analyses between pigment and ancillary data over the entire region as well as subregions, and an assessment of the quality of the pigment data, are presented. (Auth. mod.)

J-48042

Boyer, D.L., Chen, R.R., Tao, L.J., Davies, P.A., **Physical model of bathymetric effects on the Antarctic Circumpolar Current**, *Journal of geophysical research*, Feb. 15, 1993 98(C2), p.2587-2608, 28 refs.

Laboratory experiments were conducted to simulate effects of the bathymetry of the southern ocean on the physical characteristics of the Antarctic Circumpolar Current (ACC). The experiments demonstrated the feasibility of simulating the surface wind stress in physical models by source-sink forcing. In spite of limitations, the simulations of the physical model for both the homogeneous and linearly stratified cases were shown to be in good agreement with observations of the ACC. It was shown that the Eltanin and Udintsev fracture zones in the vicinity of 135W are important factors in directing the ACC eastward across the Southeast Pacific Basin to the Drake Passage. The model results suggest that these fracture zones can influence the nature of the flow in the western Atlantic because of their control of the flow through the Drake Passage. The estimated volume transports through the Drake Passage based on the model results are in fair agreement with oceanic observations. Estimates of the spin-up time of the system for homogeneous and stratified cases are provided. (Auth. mod.)

J-48051

González, H.E., **Distribution and abundance of minipellets around the Antarctic Peninsula. Implications for protistan feeding behaviour**, *Marine ecology progress series*, Dec. 28, 1992 90(3), p.223-236, Refs. p.234-236.

During the European Polarstern Study in the Scotia and Weddell Seas (SWS) and the 26th Antarctic Chilean Expedition in the South Shetland Is. area (SSIA), water and net samples were collected to assess the distribution, abundance, and role of minipellets in antarctic waters. Two groups of minipellet producers, phaeodarian radiolarians and unarmored dinoflagellates, were identified. The vertical (from surface to 100 m depth) distribution patterns of minipellets (5 to 100 microns) showed that the maximum concentration was located mainly between surface and 50 m depth in both the SWS and SSIA. On average, higher numbers of minipellets were found in the SWS (814/l) than in the SSIA (164/l). The most frequent and abundant silicified food items found in minipellets were diatom frustules. In phaeodarian radiolarians, the presence of partially ingested undamaged diatoms indicated that, in addition to feeding on detritus, phaeodarians also feed directly on phytoplankton. In both areas, higher numbers of minipellets occurred when the larger phytoplankton (> 25 microns) dominated the phytoplankton assemblage. Similarities between the diatom species composition in the water column and enclosed in minipellets suggest that grazing was non-selective. (Auth.)

J-48092

Kuvaas, B., Leitchenkov, G., **Glaciomarine turbidite and current controlled deposits in Prydz Bay, Antarctica**, *Marine geology*, Nov. 1992 108(3/4), p.365-381, 39 refs.

A thick sequence (up to 2200 m) of presumed post late Eocene/early Oligocene glaciomarine sediments is inferred to be present on the Prydz Bay continental rise. The inferred glaciomarine sediments in Prydz Bay appear to be deposited in a complex manner, suggesting interaction by both turbidity currents and strong bottom currents. Reflection seismic profiles from the lower continental slope and rise show an abundance of current-influenced deposits, such as sediment waves and large sediment ridges with similarities to contourite drifts. In addition, large channel-levee complexes are abundant, suggesting deposition by turbidity currents and other massflow processes. Large channels and sediment ridges trend oblique to the continental margin. The geometry and character of the seismic reflection pattern suggest that the ridges have been deposited under the combined influence of overflow from downslope channelized turbidity currents and strong bottom water flow. The observed sediment waves and the difference along eastern and western channel margins suggest that bottom currents are flowing towards the west. It is suggested that the initiation of turbidite sedimentation occurred in the late Eocene-early Oligocene, when the Amery Ice Shelf reached the shelf edge for the first time. Onset of current controlled depositions may possibly be related to the opening of the Drake Passage at the Oligocene/Miocene boundary. (Auth. mod.)

J-48095

Stocker, T.F., Broecker, W.S., **Steady-state and transient modeling of tracer and nutrient distributions in the global ocean. Progress report, June 1, 1991-March 31, 1992**, *U.S. Department of Energy. Report*, Mar. 26, 1992 DOE/ER/61202-1, 22p., DE92011805, 32 refs.

The deep circulation model developed by Wright and Stocker has been used to represent the latitude-depth distributions of temperature, salinity, radiocarbon and "color" tracers in the Pacific, Atlantic and Indian Oceans. Restoring temperature and salinity to observed surface data, the model shows a global thermohaline circulation where deep water is formed in the North Atlantic and in the southern ocean. A parameter study reveals that the high-latitude surface salinity determines the composition of deep water and its flow in the global ocean.

In increasing southern ocean surface salinity by 0.4 ppt, the Atlantic Deep Water is important to one where Antarctic Bottom Water is dominant. An inorganic carbon cycle with surface carbonate chemistry is included, and gas exchange is parameterized in terms of $p\text{CO}_2$ differences. Pre-industrial conditions are achieved by adjusting the basin-mean alkalinity. The authors use more realistic surface boundary conditions which reduce sensitivity to freshwater discharges into the ocean. In a glacial-to-interglacial experiment, rapid transitions of the deep circulation between two different states occur in conjunction with a severe reduction of the meridional heat flux and sea surface temperature during peak melting. After the melting the conveyor belt circulation restarts. (Auth. mod.)

J-48101

Nikolaev, V.I., Strizhov, V.P., Velivetskaia, T.A., **Isotopic pleiad of oxygen in atmospheric precipitation in the polar regions** [Izotopnaia pleiada kisloroda v atmosferykh osadkakh poliarnykh], *Akademiia nauk SSSR. Institut geografii. Materialy gliatsiologicheskikh issledovaniĭ*, 1991 Vol.71, p.109-112, In Russian with English summary. 14 refs.

Studies of isotope composition of the $\delta\text{O-17}$ and $\delta\text{O-18}$ oxygen in snow, firn and ice of Antarctica, Greenland and Severnaya Zemlya have been conducted. The tests characterize atmospheric precipitation in high latitudes of the present time, as well as of the Little Ice Age, the Early Holocene thermic optimum, the boundaries of the Pleistocene and Holocene, the Late Ice Age, the Last Interglaciation Period and the maximum of the Pleistocene Glaciation. The experimental data correspond to the theoretical straight line $\delta\text{O-17} = 0.52 \delta\text{O-18}$, and testify to the absence of mass-independent fractioning of oxygen isotopes in the global circulation of water. (Auth. mod.)

J-48119

Yang, H.F., **Determination of low molecular volatile fatty acids by PHILC in cold water environment in Antarctica**, *Antarctic research (Chinese edition)*, Sep. 1992 4(3), p.46-51, In Chinese with English summary. 7 refs.

Concentrations of low molecular fatty acids in sea water samples obtained on Jan. 3, 1989 are discussed and shown in tables. Acrylic acid concentrations of 0.004-0.042 microgram/ml and 0.1-1.0 microgram/ml of other volatile fatty acids, in coastal waters 0-60 m deep, are reported. The PHILC method used is described; it is found to be accurate, well suited for such determinations in cold antarctic waters, and easy to operate even with very small samples (the lowest limits suggested are 0.001 microgram/ml for acrylic acid and 0.1 microgram/ml for other volatile fatty acids).

J-48150

Yang, H.F., **Preliminary study of lower molecular volatile fatty acids in cold antarctic coast water**, *Oceanologia et limnologia sinica*, Nov. 1992 23(6), p.599-605, In Chinese with English summary. 6 refs.

Lower molecular volatile fatty acids were determined, using the HPLC method, in samples from coastal waters in the Vestfold Hills region in May, 1989. They consisted of formic acid (0.4-7.0 micromol/L), acetic acid (0.1-40.0 micromol/L), propionic acid (0.7-128.0 micromol/L), and acrylic acid (0.001-0.393 micromol/L). Their concentration presented seasonal variations. It is suggested that lower molecular volatile fatty acids are produced by microbial activity and that the acrylic acid is a result of cell metabolism during *Phaeocystis pouchetii*'s bloom.

J-48154

Gragnani, R., Torcini, S., **Major, minor and trace element distributions in surface water in Terra Nova Bay, Antarctica**, *Science of the total environment*, Sep. 7, 1992 Vol.125, p.289-303, 23 refs.

Geochemical research was carried out on the distribution and circulation of major, minor and trace elements in meltwaters, streams and lakes from the Terra Nova Bay area. The main water components are of marine origin derived from sea spray, as shown by the ratios between the major cations and anions compared with sea water. The salinity values point instead to a concentration in the dissolved salts due to evaporation and sublimation. In general, water-rock interaction is limited, but in some cases the high ratios between Ca/Cl, Li/Cl etc., compared with sea water, prove rock leaching. Generally speaking, trace element levels do not exhibit anomalous values. The highest Ni and Mo contents are found to be connected with outcrops of metamorphic and granitic formations, respectively. (Auth.)

J-48162

Suk, M.S., Lee, H.W., Kim, D.Y., **Oceanographic conditions in the Bransfield Strait and in the limits of the adjacent seas**, *Korean journal of polar research*, Dec. 1992 3(1/2), p.17-26, In Korean with English summary. 11 refs.

In the summer of 1991-1992, the 5th Korea Antarctic Research Program carried out an oceanographic survey from the Bransfield Strait to the Weddell Sea, along the 54W longitude line, with special attention to the meso-scale eddies in the basin at the center of the Strait. Analysis of temperature and salinity distribution shows a strong influx of water masses from the Drake Passage in the area north of the South Shetland Is., while the influence of the Weddell Sea becomes dominant in the southern area. The lowest temperature recorded was -1.54C at 100 m depth near King George I., in a layer of low temperature water mass between 50 and 400 m, which is believed to originate in the Weddell Sea Gyre.

J-48186

Takizawa, T., **Preliminary results of hydrography under fast ice in Lützow-Holm Bay, Antarctica in 1990**, NIPR Symposium on Polar Meteorology and Glaciology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1992, p.106-125, 13 refs.

Seasonal variations in water structure under fast ice in Lützow-Holm Bay were observed from Apr. to Dec., 1990. Two warm and oxygen-poor waters were observed. One shows temperatures higher than 0 C, salinities of more than 34.6 and oxygen less than 6 ml/l, and is found in the bottom layer, below 700 m, in the Shirase Submarine Valley. The other is found in the upper layer, with temperatures of -1.4 C, salinities of around 34.2 and oxygen of 6.3-6.9 ml/l. The origin of both waters is a blob of the Circumpolar Deep Water (CDW) drawn from offshore, and they are admixtures of CDW with overlying Winter Water in various proportions. Due to high density, the former is confined to the bottom layers of deep troughs; the latter, with low density, migrates to the upper layer with the water circulation in the bay. In spring a cold and oxygen-rich water ($T < 1.6$ C, $\text{O}_2 > 7.2$ ml/l) was observed at the intermediate depth of about 250-350 m near the top of the downslope of the submarine valley. It is probable that this water was formed by sea ice processes during winter. (Auth.)

J-48229

Tokarczyk, R., Lipski, M., Perez, F.F., Reboredo, R.P., **Hydrology and hydrochemistry of the surface water layer near the ice-edge in the Scotia Sea (December 1989-January 1989)**, *Polish polar research*, 1991 12(4), p.495-505, With Polish summary. 33 refs.

Four water masses were distinguished in the upper water layer between Elephant I. and the South Orkneys. Measurements of temperature, salinity, concentrations of dissolved oxygen and silicates were used for the analysis of the hydrological situation and to recognize the origin of water masses. For additional information, nitrates and chlorophyll concentrations were used. Drake Passage and Bransfield Strait waters occupied the western part of the investigated area, from surface to 150 m depth. Below, the Circumpolar Warm Deep Waters (CWDW) were found. The region east of 53.5W was occupied by winter Weddell Sea water. Above this, a 45 m thin layer of summer modification of Weddell Sea Surface Water was found between 49W and the South Orkneys. The highest chlorophyll *a* concentrations were found in this modified water. (Auth.)

J-48230

Lipski, M., **Environmental conditions and phytoplankton standing crop near pack-ice in the Scotia Sea (December 1988-January 1989)**, *Polish polar research*, 1991 12(4), p.507-513, With Polish summary. 22 refs.

Results of an oceanographic survey along the edge of drifting pack ice in the area between Elephant I. and the South Orkney Is. are reported. The influence of sea ice on hydrological factors was very weak. It was not possible to develop oceanographic features characteristic for marginal sea-ice zones in the areas with well-marked surface currents and dynamic hydrological conditions. The spatial distribution of chlorophyll was governed by water stability, although during this survey, areas with enhanced vertical stability could not be described in terms of a sea-ice edge influence. (Auth.)

J-48264

Stevens, D.P., Killworth, P.D., **Distribution of kinetic energy in the southern ocean: a comparison between observations and an eddy resolving general circulation model**, *Royal Society of London. Philosophical transactions. Series B*, Nov. 30, 1992 338(1285), p.251-257, 18 refs.

DLC QH301.R648a

It is widely believed from model studies that the transient eddy field plays an important role in the dynamics of the southern ocean. Accordingly, the distribution and partition of kinetic energy from an eddy-resolving general circulation model of the southern ocean is compared with existing non-altimetric observations. Good agreement in distribution is found with some of the more recent observations. The amplitudes of the model energies, while for the most part well correlated with observations, are significantly lower than those observed (although observations differ greatly in their estimates). This reduction of energy is in agreement with other recent eddy-resolving models, and is partly caused by the lack of correctly varying wind and buoyancy forcing, together with inadequate representation of instability processes. Nevertheless, the correlations suggest that the model results may be used as a proxy for reality in many circumstances. (Auth.)

J-48302

Matsuura, T., Takeda, A., Yamagata, T., **Sensitivity experiment of ocean general circulation model—responses for wind stress (first report)**, *Japan. National Research Institute for Earth Science and Disaster Prevention. Report*, Oct. 1991 No.48, p.39-68, In Japanese with English summary. 17 refs.

A coarse resolution, primitive equation ocean general circulation model in a cyclic channel, with idealized wind stress, is used to explore sensitivity to the assumption that the vertical viscosity and diffusivity depend upon the level 2.5 turbulent closure model. The characteristics of the turbulent closure model are clarified by comparing the constant vertical eddy viscosity and diffusivity model. The model

domain is idealized for the region of the Antarctic Circumpolar current and the density and current structures obtained from the numerical simulation are compared with those observed at the Drake Passage. It is found that the turbulent closure resolves efficiently the Ekman boundary layer at the sea surface and the turbulent mixing layer. This model settles the problem which occurs with extreme vertical shear in the mixed layer when a constant vertical eddy viscosity and diffusivity are used. It is known that there is a region of a low density pool in the north of the Drake Passage. The described model confirms the above observational result. It is concluded that the low density pool is formed by strong mixing in the Drake Passage because the Ekman transport is northwards for westerly wind in the Southern Hemisphere.

J-48305

Popov, I.K., **Sea surface temperature of the southern ocean in iceberg regions** [Temperatura pri poverkhnostnogo sloia vod IUzhnogo okeana v raionakh rasprostraneniia aïsbergov], *Rossiiskaia akademiia nauk. Doklady*, 1992 326(1), p.181-183, In Russian. 2 refs.

The described processes were observed during the summer, their intensity depending on the thermohaline structure of the ocean, at least up to the depth of the iceberg draft. The observations in below-zero temperatures did not reveal a significant impact of the icebergs on the surface temperatures of water at intervals greater than 300-400 m. (Auth. mod.)

J-48349

Yoder, J.A., McClain, C.R., Feldman, G.C., Esaias, W.E., **Annual cycles of phytoplankton chlorophyll concentrations in the global ocean: a satellite view**, *Global biogeochemical cycles*, Mar. 1993 7(1), p.181-193, 40 refs.

This paper uses coastal zone color scanner chlorophyll imagery (CZCS-Chl) to determine annual cycles in phytoplankton chlorophyll (biomass) averaged over very large areas of the global ocean. Among the results presented: subpolar waters in the Northern Hemisphere (NH) have mean monthly CZCS-Chl concentrations during May and June that are manyfold higher than in winter, particularly in the North Atlantic; and subpolar waters in the Southern Hemisphere (SH) do not show differences between spring maxima and winter minima as large as those in the subpolar NH. The simple patterns reported here imply that mean annual cycles in phytoplankton biomass averaged over very large areas of the global ocean are largely explainable by very simple mathematical models. (Auth. mod.)

J-48356

Foster, T.D., **Antarctic bottom water formation in the northwestern Weddell Sea**, *Antarctic journal of the United States*, 1991 27(5), p.98-99.

As part of a project to study the formation of antarctic bottom water in the Weddell Sea, an oceanographic expedition was conducted in its northwestern sector. The northwestern Weddell Sea was mostly covered by loose ice pack during the period of the expedition, so it was not possible to extend the southern leg of the cruise into the continental shelf. A figure shows the cruise track and the positions of the hydrographic stations in the Weddell Sea. During the study, 150 hydrographic stations were occupied for a total of 220 conductivity-temperature-depth/rosette casts. While at sea, analyses were made of 205 water samples for salinity, 369 for oxygen, 19 surface water samples for lead isotopes, 110 bottom water samples for oxygen isotopes, and three vertical profiles for cadmium. Using the BAS 257, water samples were filtered for suspended matter, and with the Argentine Antarctic Institute, 120 samples were analyzed for microplankters.

J-48358

Gordon, A.L., Huber, B.A., Bagriantsev, N., **Weddell Gyre warm-pool characteristics**, *Antarctic journal of the United States*, 1991 27(5), p.102-104, 6 refs.

As part of the Winter Weddell Gyre Study 1989, the Russian ice-breaking research vessel *Akademik Fedorov* occupied stations in the vicinity of Maud Rise and drifted for 10 days within the warm pool collecting data at regular intervals. A portion of the data collected is a suite of conductivity-temperature-depth profiles to 500 m collected at 4-hour intervals during the ship's drift within the warm pool. These conductivity-temperature-depth stations and others occupied during the ship's passage through the region are shown in a figure with the bottom topography of the area displayed for reference. The drift series occurred near 65.5S and 3W, just north of a slight ridge in the bottom relief. The warm pool is characterized by warm t-max and mixed-layer temperatures compared to the surrounding area. Within the pool, t-max temperatures average about 1 C whereas typical t-max temperatures to the north are on the order of 0.4 C (station 118, for example). Mixed-layer temperatures in the pool range from -1.83 to -1.72 C. The mixed layer is typically thinner over warm features in the Weddell Gyre.

J-48360

Dixon, J.E., Domack, E.W., **Circulation and bathymetry of Lapeyrère Bay, Anvers Island**, *Antarctic journal of the United States*, 1991 27(5), p.108-111, 7 refs.

This study is part of a regional investigation on the circulation and depositional environment of fjords and bays along the western side of the Antarctic Peninsula. Studies within Lapeyrère Bay were conducted to define the relative role of meltwater input, estuarine circulation, and bathymetry upon sedimentation. The bathymetric compilation illustrates that Lapeyrère Bay is marked by a single, deep submarine valley which extends from the head, the front of Illion Glacier, to the mouth, Dallman Bay. A single low relief sill (<60 m) is present about one-sixth of the distance from the head of the fjord. The revised bathymetry benefitted from several continuous bottom profiles that improved the resolution of the bottom topography over previous interpretations. Lapeyrère Bay has a length to width ratio of 7:1, and therefore is one of the more linear bay systems along the Palmer Archipelago and Peninsula. This means that meltwater input, if significant, should produce recognizable salinity gradients in both the vertical and horizontal dimensions, particularly in the head regions of the fjord. Oceanographic data collected in Dec. 1987 demonstrated a relatively low salinity surface layer (31.8-33.75 parts per thousand) in the upper 10 m. The bay was essentially free of brash and loose pack ice at this time, and no horizontal salinity gradient within the surface layer was observed. The salinity minimum at the surface actually corresponds to the juncture with a small bay on the northwest side rather than the head of Lapeyrère Bay or Illion Glacier.

J-48363

Dunbar, R.B., Leventer, A., **Circulation in eastern McMurdo Sound, Antarctica, January through November 1990**, *Antarctic journal of the United States*, 1991 27(5), p.117-120, 2 refs.

The winter circulation regime is of great importance to benthic communities because it exerts a primary control on the delivery of food to the seafloor following the cessation of summer blooms in surface waters and sea ice. It is also likely that regular seasonal shifts in the circulation pattern within McMurdo Sound influence the activities and standing stocks of large, highly mobile organisms such as penguins, marine mammals, and fish. Collectively, current-meter data suggest that important shifts in upper water column flow recur on a seasonal basis. A consistent feature of the current meter records is northerly flow at depths of 160 to 180 m between Aug. and late Nov., opposite to the near-bottom flow. This flow, if characteristic of the uppermost water column, must reverse during Dec. to permit

the annually observed southward penetration of phaeocystis-laden waters into eastern McMurdo Sound. It is likely that flow reversal, rather than the onset of high productivity in the open Ross Sea, controls the precise timing of this event.

J-48367

May, S.E., McClennen, C.E., Domack, E.W., **Substantial position correction to the Andvord Bay coastline and bathymetry using the global positioning system and radar imaging**, *Antarctic journal of the United States*, 1991 27(5), p.128-129, 1 ref.

During R/V *Polar Duke* cruise 90-7 into Andvord Bay significant discrepancies in the location of the charted coastline were noted. Global positioning system ship positions, while on station roughly equidistant from each shore near the heads of the bay, repeatedly plotted the ship's position to be on land east of Lester Cove and north of the charted coast. In general, the inner end of the charted position of the bay needs to be pivoted to the northeast by more than 2 km. Two photographs of the ship's Furuno radar image monitor were used to plot the position of the shore and glaciers relative to the global positioning system monitor, which simultaneously provided the ship's position. A print of the radar image enlarged over 10 times, using a Savin 7220 copier, was similar in outline to the projection of a 35 mm slide of the radar screen. By aligning the images with true north and with the ship's global positioning system position, it was possible to redraw the coastline in a more realistic location. Although the charted position of the mouth of the bay agreed well with the radar images, the rest of the coast position was rotated counterclockwise as shown in an accompanying figure.

J-48372

Saunders, P.M., Thompson, S.R., **Transport, heat, and freshwater fluxes within a diagnostic numerical model (FRAM)**, *Journal of physical oceanography*, Mar. 1993 23(3), p.452-464, 33 refs.

Results are presented from the integration of a fine-resolution numerical model of the ocean operating in a diagnostic mode. The region covered lies south of 24S, as depicted in the Fine Resolution Antarctic Model (FRAM) Atlas. Here transports, heat, salt, and freshwater fluxes are examined at 60S and near 30S in all three oceans. Results are found to be generally realistic. At midlatitude the meridional heat flux is largely determined by the structure of the mean meridional motions and to a lesser degree by the gyre-scale horizontal motions. These roles are reversed for freshwater fluxes. At a fixed high latitude the freshwater flux is determined by the mean meridional motions and the heat flux, principally by the large-scale wandering of the circumpolar current across the latitude. Only in this latter case, namely for the heat flux at 60S, are mesoscale motions significant. The model underestimates the production and export of abyssal water; the climatological state with which it is initialized is identified as the likely cause. A suggestion is offered for assessing the accuracy of diagnostic integrations. (Auth. mod.)

J-48373

Marshall, J., Olbers, D., Ross, H., Wolf-Gladrow, D., **Potential vorticity constraints on the dynamics and hydrography of the southern ocean**, *Journal of physical oceanography*, Mar. 1993 23(3), p.465-487, 33 refs.

Constraints on the hydrography and geostrophic velocity shear of the southern ocean implicit in its potential vorticity field are discussed and illustrated by diagnostic study of observed and modeled potential vorticity fields. A stress-driven, thermodynamically inactive, eddy-resolving quasigeostrophic model of the southern ocean suggests that, through the systematic erosion of potential vorticity gradients by geostrophic eddies, the large-scale flow equilibrates toward a state in which interior potential vorticity gradients are small. Observations of

the large-scale isopycnal distribution of potential vorticity (IPV), deduced from climatological hydrographic data, reveal a much richer structure. The most striking feature of the IPV field is the presence of large, near-surface gradients of IPV (a vortocline) coinciding with the axis of the Antarctic Circumpolar Current (ACC). To the south of this front, potential vorticity (PV) is large; to its north, PV has low values, and relative to those found in the vortocline, PV gradients are indeed small. Beneath near-surface layers it is shown that a striking functional relationship exists between IPV and potential density, suggesting that the broad density structure and baroclinic shear of the southern ocean can be found by inverting, consistent with boundary conditions, a potential vorticity distribution that is uniform on isopycnal surfaces. An analytical model of the zonally averaged ACC based on the uniform PV model is presented. The model is then applied in a more realistic setting and the implied hydrography, relative baroclinic velocity, and dynamic topography of the uniform PV model compared favorably to the observations in the South Atlantic. (Auth. mod.)

J-48378

Staubes, R., Georgii, H.W., **Biogenic sulfur compounds in seawater and the atmosphere of the antarctic region**, *Tellus*, Apr. 1993 45B(2), p.127-137, Refs. p.136-137.

Shipboard measurements of dimethyl sulfide (DMS), carbonyl sulfide (COS) and carbon disulfide (CS₂) in seawater and the marine boundary layer were performed during a cruise between Punta Arenas and Cape Town through the Weddell Sea in Nov.-Dec. 1990. The DMS concentrations in seawater averaged to 71 ngS/l, while atmospheric DMS mixing ratios showed a range between 2 and 1048 pptv. In the Weddell Sea, where DMS mixing ratios as low as 24 pptv on average were observed, the extensive ice cover seemed to minimize the gas exchange between seawater and the overlying atmosphere. The COS levels in seawater showed a mean of 3.5 ngS/l with minor variability. Atmospheric COS mixing ratios measured over the Weddell Sea averaged 453 + /- 43 pptv. In contrast, COS concentrations during advection processes of continental air masses over the Drake Passage were evidently higher with a mean of 628 + /- 42 pptv. The concentrations of CS₂ in the remote marine boundary layer were below the detection threshold of 7 pptv, with enhanced concentrations of about 35 pptv observed in air masses influenced by continental inputs. CS₂ values in surface seawater were mostly below the threshold of 0.43 ngS/l, with few exceptions revealing CS₂ values between 0.48 and 1.43 ngS/l. In 91% of all seawater samples taken during this cruise CS₂ was not found in detectable concentrations. (Auth.)

J-48385

Yanagi, K., Yasuda, M., Fukui, F., **Reexamination of the fractionation of total dissolved phosphorus in seawater using a modified UV-irradiation procedure, and its application to samples from Suruga Bay and antarctic ocean**, *Journal of oceanography*, Sep. 1992 48(3), p.267-281, Refs. p.279-281.

Application of a modified UV irradiation procedure to the fractionation of total dissolved phosphorus (TDP) in seawater was examined. Before and after the UV irradiation, colorimetric measurements of soluble reactive phosphorus (SRP) were made by the method of Murphy and Riley (1962) to determine the liberation rate of orthophosphate from P-compounds in the sample. Experiments using 19 different P-compounds indicated that organic phosphate-esters containing only monomers of phosphate were readily decomposed by a 20-minute UV irradiation period. Release of SRP from organic polyphosphates was minimal. Vertical profiles of DOP and UV-P observed in the oligotrophic regions of Suruga Bay and the antarctic ocean indicated that UV-P was a major part of TDP in euphotic layers, where inorganic nutrients were probably limiting the active growth of phytoplankton. It is probable that UV-P can be utilized as a source of nutrient-P, in place of PO₄-P. (Auth. mod.)

J-48392

Orsi, A.H., Nowlin, W.D., Jr., Whitworth, T., III, **On the circulation and stratification of the Weddell Gyre**, *Deep-sea research*, Jan. 1993 40(1), p.169-203, 44 refs.

The availability of new high-quality hydrographic data has prompted a re-examination of the circulation in the Atlantic sector of the southern ocean. Dynamic topography maps and tracer distributions on selected isopycnal surfaces show that the Weddell Gyre is a large, elongated cyclone located south of the Antarctic Circumpolar Current (ACC), extending northeastward from the Antarctic Peninsula. Patterns of geostrophic shear and a southward turn of the ACC mark its northeastern end near 30E. The northern limb of the gyre extends over the southern Scotia Sea and loops northward around the South Sandwich Arc. At greater depths, the axis of the gyre is found closer to, or over, the southern flanks of the South Scotia, America-Antarctic, and Southwest Indian Ridges. The various water masses and currents involved in the perpetuation of the Weddell Gyre and their relationships with each other and the underwater topography are identified, defined, and traced. (Auth. mod.)

J-48408

Ushio, S., Takizawa, T., **Oceanographic data in Lützow-Holm Bay of Antarctic Climate Research Programme from March 1990 to January 1991 (JARE-31)**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.184, 34p.

The report presents tabulated data from observations under the fast ice and polynyas of Lützow-Holm Bay carried out from Mar. 1990 to Jan. 1991. They include water temperature and salinity profiles, dissolved oxygen measurements, and aircraft-deployed expandable bathythermographic data.

J-48410

Nakamura, H., Noguchi, K., **Oceanographic data of the 32nd Japanese Antarctic Research Expedition from November 1990 to March 1991**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.187, 50p.

The report presents data of oceanographic observations on board the icebreaker *Shirase* and tidal observations at Showa Station. They include surface water temperature measurements and chemical analysis, current vertical profiles, expandable bathythermograph data collected at 202 stations, and conductivity, temperature and depth profiling data collected at 5 stations. Serial observations were made at 6 stations; all results, together with meteorological data, are presented in tables.

J-48423

Van der Loeff, M.M.R., Berger, G.W., **Scavenging of Th-230 and Pa-231 near the Antarctic Polar Front in the South Atlantic**, *Deep-sea research*, Feb. 1993 40(2), p.339-357, 48 refs.

Vertical profiles of dissolved and particulate Th-230 and Pa-231 were obtained across the Antarctic Circumpolar Current (ACC) in the southern Atlantic. North of the Polar Front, dissolved and total Th-230 increase with depth in conformity with published scavenging models. There is no depletion of Th-230 or Pa-231 in the water column south of the Polar Front, thought to be an area of enhanced biological productivity. Th-230 concentrations increase threefold to the Weddell Sea across the ACC. Dissolved and total Pa-231 concentrations are relatively constant below 500 m depth at about 0.3 dpm/cu m, and change little with depth or latitude. The results from the Weddell Gyre are explained by a mixing-scavenging model that takes into account the input of lower Circumpolar Deep Water through upwelling, which is the main source of water in the Weddell Gyre and is enriched in Th-230 but not in Pa-231. Th-230 accumu-

lates in the Weddell Gyre as a result of a reduction in the scavenging rate and by ingrowth from U-234. Ingrowth is more significant for Th-230 than for Pa-231 because the residence time of water in the gyre (about 35 years) is similar to the scavenging residence time of Th in the south Atlantic (29 years) but shorter than that of Pa (120 years). It is argued that changes in Th-230 accumulation in the past may reflect changes in water residence time and in the formation rate of Weddell Sea Deep Water. (Auth.)

J-48447

Gouretski, V.V., Danilov, A.I., **Weddell Gyre: structure of the eastern boundary**, *Deep-sea research*, Mar. 1993 40(3), p.561-582, 26 refs.

In Jan.-Feb. 1988 a survey in the eastern Weddell Gyre by 3 Soviet research vessels showed the complicated hydrographic structure that results from the intensive interaction between the waters of the Weddell Gyre and Antarctic Circumpolar Current. Three types of mesoscale features were found: warm-core eddies of circumpolar origin, with maximum temperatures in the range 1.7-2.1 C; warm-core eddies formed at the Weddell Front with maximum temperatures of 0.8-1.4 C; and cold-core features from the Cold Regime of the Weddell Gyre with a maximum deep water temperature of 0.7 C. The inflow of the Circumpolar Deep Water into the gyre is facilitated by the sharp southward excursion of the Antarctic Circumpolar Current core at about 26E due to the topographical constraint of the mid-ocean ridge. Intense warm-core eddies forming at the Polar Front and drifting southward are visible in GEOSAT altimeter data as relatively high sea-level variability. The pure Cold Regime deep water with a maximum temperature <0.5 C occurs only in isolated patches west of 21E. (Auth.)

J-48450

McFeters, G.A., Barry, J.P., Howington, J.P., **Distribution of enteric bacteria in antarctic seawater surrounding a sewage outfall**, *Water research*, Apr. 1993 27(4), p.645-650, 19 refs.

The spatial distribution and movement of the sewage plume from McMurdo Station was investigated in the ocean under the early summer sea ice. Ocean currents were also examined to determine their effect on the movement of the plume. Samples of sea water were obtained via holes drilled through the ice and analyzed for coliform bacteria. Coliform densities in ice cores were also determined. Densities of coliform bacteria as high as 100,000/100 ml were found along the c. 1 km shoreline of McMurdo Station, and the plume extended 200-300 m seaward. The relocation of the outfall from a surface configuration to the subsurface (11 m deep) had little influence on the distribution of the plume that sometimes reached the seawater intake station, 400 m to the south. Ocean current measurements in the study area confirmed that, while the prevailing advection was to the north and away from the intake area, episodic reversals of flow at some current meter stations coincided with pulses of sewage that moved to the intake. These findings support the use of bacterial indicators as one means to map the distribution and movement of recent sewage contamination in cold (-1.8 C) sea water, and provide evidence that the disposal and movement of domestic wastes deserves attention in coastal polar environments. (Auth.)

J-48454

Sikes, E.L., Volkman, J.K., **Calibration of alkenone unsaturation ratios (Uk'37) for paleotemperature estimation in cold polar waters**, *Geochimica et cosmochimica acta*, Apr. 1993 57(8), p.1883-1889, Refs. p.1888-1889.

C37-C39 long-chain unsaturated ketones (alkenones) and alkenes were identified in samples of particulate organic matter obtained from surface waters spanning the temperature range -0.7 to 12.2 C in the southern ocean from Tasmania south to the antarctic shelf. The car-

bon number distribution indicates that these compounds are derived from the prymnesiophyte alga *Emiliana huxleyi* which is the predominant coccolithophorid in these waters. Values of Uk'37 were calculated according to the definition $Uk'37 = [37:2]/([37:2] + [37:3])$, where $[37:x]$ is the concentration of the C37 alkenone with "x" double bonds, and is plotted against sea surface temperature (SST). Over much of the temperature range the relationship between Uk'37 and temperature is remarkably linear, and is best fitted by the simple equation $Uk'37 = 0.0414T - 0.156$ (for temperatures of 4-25 C). This calibration of Uk'37 with temperature for field samples is significantly different from that established from analyses of prymnesiophyte algae in culture, and it diverges especially at the colder temperatures. Data for temperatures below about 4-6 C show increased scatter, and the calibration at these low temperatures may be better fitted by a nonlinear exponential function, but this requires further testing. (Auth. mod.)

J-48468

Park, Y.H., Charriaud, E., Gambéroni, L., Kartavseff, A., **MD 68/SUZIL expedition on board the Marion Dufresne, Apr. 12-May 20, 1991. Vol.1: Hydrology** [Recueil des données de la campagne MD 68/SUZIL à bord du *Marion Dufresne*, 12 avril-20 mai 1991. Vol.1: Hydrologie], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, May 1993 No.93-01, 214p., In French. 8 refs.

This is a collection of data obtained during the Apr.-May 1991 SUZIL expedition to the Crozet and Kerguelen Is. to study the hydrology, ichthyology and sedimentology of the area. Eighty-one operations are listed; preliminary results are discussed. The bulk of the volume consists of tables, graphs and charts resulting from the above research.

J-48472

Lu, G., Keller, G., **Paleocene-Eocene transition in the antarctic Indian Ocean: inference from planktic foraminifera**, *Marine micropaleontology*, Apr. 1993 21(1/3), p.101-142, Refs. p.140-142.

Isotopic depth stratification and relative abundance studies of planktic foraminifera at ODP Site 738 reveal 3 major faunal turnovers during the latest Paleocene and early Eocene, reflecting the climatic and structural changes in the antarctic surface ocean. Faunal Event 1 occurred near the Paleocene/Eocene boundary and is characterized by a faunal turnover in deep dwellers, decreased relative abundance in intermediate dwellers, and increased relative abundance in surface dwellers. This event marks a temporary elimination of the vertical structure in the surface ocean over a period of more than 63,000 years. Faunal Event 2 occurred near the AP5a/AP5b Subzonal boundary and is characterized by a faunal turnover in deep dwellers with no apparent change in surface and intermediate dwellers. Increased individual size, wall thickness and relative abundance in deep dwelling chiloguembelinids suggest the formation of deep oxygen minima in the antarctic oceans during the maximum polar warming, possibly as a result of upwelling of nutrient-rich deep water. Faunal Event 3 occurred in Subzone AP6 and is characterized by a faunal turnover in surface dwellers and a delayed diversification in deep dwellers. This event marks the onset of antarctic cooling. (Auth. mod.)

J-48479

Duhamel, G., comp, **SKALP expeditions 1987-1988 to Kerguelen Is. on board the ships *Skif* and *Kalper***

[Campagnes SKALP 1987 et 1988 aux îles Kerguelen à bord des navires *Skif* et *Kalper*], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, 614p., In French. Refs. passim. For individual papers see B-48480 through B-48482, B-48485 through B-48498, J-48483 and J-48484.

This report is presented in two parts. Part 1 is a collection of individual reports on oceanographic, meteorological and ichthyological research carried out jointly by French and Soviet scientists on board the R/V *Skif* and *Kalper* during the 1987 and 1988 SKALP expeditions to the Kerguelen Is. Part 2 consists of 45 annexes containing tables, graphs, lists and charts from data collected during the cruises.

J-48483

Charriaud, E., **Hydrological results and meteorology**

[Résultats hydrologiques et météorologie], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.53-56, In French.

Results of oceanographic surveys carried out during 4 cruises of the ship *Skif* around the Kerguelen Is. from Feb. 1987 to Feb. 1988 are summarized. The positions of stations during each cruise are shown on maps. Meteorological data collected during the cruises (atmospheric pressure, wind speed and direction) are presented in graphs included in the annexes at the end of the volume in which this article appears.

J-48484

Cherkashchenko, N.V., **Distribution of hydrochemical parameters in waters surrounding the Kerguelen Is. in 1987 and 1988** [Distribution des paramètres

hydrochimiques dans les eaux entourant les îles Kerguelen pour la période 1987 à 1988], *Institut Français pour la Recherche et la Technologie Polaires. Expéditions Paul-Émile Victor. Rapports des campagnes à la mer*, Mar. 1993 No.93-01, p.57-70, 4 refs.

On the basis of the data collected during joint Soviet-French expeditions to shelf waters of the Kerguelen Is. (Feb.-Apr., July-Aug., 1987 and Feb., 1988) a characteristic of hydrochemical conditions of this area was obtained, and a comparison was made with the average long-term data calculated for two seasons: summer (Dec.-Feb.) and winter (July-Aug.) for 1969-1988. The comparison revealed no substantial differences over the years. (Auth. mod.)

J-48502

Straub, D.N., **On the transport and angular momentum balance of channel models of the Antarctic Circumpolar Current**, *Journal of physical oceanography*, Apr. 1993 23(4), p.776-782, 10 refs.

Angular momentum balances are discussed, both in general as well as in the context of simple channel models of the Antarctic Circumpolar Current (ACC). Particular emphasis is placed on the close relationship between the angular momentum balance and the meridional circulation. It is found that topographic form drag is established very early in the integration, whereas interfacial form drag can take much longer to develop. Restrictions on the geostrophic portion of the meridional circulation imposed by zonally reconnecting potential vorticity contours in the upper ocean allow derivation of an estimate for the steady-state transport. The estimate assumes little or no circumpolar flow at great depth, an assumption that stems from the belief that the band of zonally reconnecting geostrophic contours

in the southern ocean does not extend to the ocean floor. The predicted transport is proportional to the strength of the stratification and compares favorably with numerical results in the literature. Interaction of the ACC with the two adjoining gyres, however, is not accounted for by this estimate. The implications of this for the total transport through Drake Passage are discussed. (Auth.)

J-48541

Broecker, W.S., **Oceanographic explanation for the apparent carbon isotope-cadmium discordancy in the glacial Antarctic?**, *Paleoceanography*, Apr. 1993 8(2), p.137-139, 9 refs.

This paper offers a tentative thermodynamic explanation for carbon isotope-cadmium discrepancies revealed by analysis of antarctic paleoceanographic sediments, a difference which indicates their reliability as indicators of ice age ocean circulation. While the cadmium content of these sediments shows nominal glacial to interglacial change, the correlative carbon isotope change in the antarctic deep waters exceeds that of any other oceanographic location. This drop in carbon isotope ratio is attributed to the reduced interval of atmosphere-surface water interchange resulting from the effect of relatively prolonged sea ice cover in the Antarctic during the last glaciation. However, the proposed explanation requires the depletion of the carbon isotope fractionation beneath a conventional thermodynamic minimum as established for surface waters. Thus the conclusion remains strictly provisional.

J-48612

Naganobu, M., **Characteristics of oceanic structure in the waters around the South Shetland Islands of the antarctic ocean between Dec. 1990 and Feb. 1991: outstanding coastal upwelling?** (Extended abstract), NIPR Symposium on Polar Biology, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.166-170, 1 ref.

The Sixth Antarctic Survey cruise of R/V *Kaiyo Maru* was carried out in the waters around the South Shetland Is. during the austral summer of 1990-1991. To investigate seasonal changes in oceanic structure, two observations were put into operation in the same area with an interval of 40 days. The greater part of the waters surveyed was directly affected by the Antarctic Circumpolar Current. The changes of the gradients with temperature, salinity, density and flow were greater in the north and south, whereas they indicated a comparatively homogeneous zonal structure in the east and west. The more characteristic change was clearly recognized in the waters of the insular shelf from the first leg to the second leg. The Antarctic Surface Water over the insular shelf at the first leg indicated sub-zero values of temperature. Forty days later, however, the temperature in the same waters rose to plus values. The Antarctic Surface Water over the antarctic continental shelf maintains a temperature below 0 C, and even near the freezing point of seawater under ordinary conditions in the summer season. (Auth. mod.)

J-48647

Snaith, H.M., Webb, D.J., **Comparisons of ERS-1 altimeter height data and the Fine Resolution Antarctic Model (FRAM)**, ERS-1 Symposium, Cannes, France, Nov. 4-6, 1992. Proceedings, Vol.1. Space at the service of our environment. Edited by B. Kaldeich, Paris, European Space Agency, 1993, p.141-146, ESA SP-359, 14 refs.

Despite the southern ocean being an important region of the World Ocean, the understanding of its dynamics is poor. The Fine Resolution Antarctic Model (FRAM) was designed to help explain some of the dynamic mechanisms of the region, and satellite altimetry offers a method of verifying the mesoscale activity of this large-scale model. This paper considers the Agulhas region. Comparisons of the FRAM surface dynamic height fields with historical data show that the major current systems are represented with reasonable ac-

curacy. Geosat altimeter data were processed using a collinear technique to obtain sea-surface height variability. The FRAM surface pressure fields were sampled as if by an altimeter and processed using the same collinear technique in order to gain an insight into errors involved in the method. The resultant variability fields are here compared with Geosat height variability and bathymetry. The same collinear technique was applied to ERS-1 altimeter data from the commissioning phase. (Auth. mod.)

J-48672

Cripps, G.C., **Extent of hydrocarbon contamination in the marine environment from a research station in the Antarctic**, *Marine pollution bulletin*, 1992 25(9-12), p.288-292, 9 refs.

Low level hydrocarbon contamination is measurable in the vicinity of antarctic stations. N-alkane and polycyclic aromatic hydrocarbon (PAH) concentrations in seawater and sediment at Signy Station, South Orkney Is. indicated contamination was confined to within a few hundred meters of the station. Total n-alkane concentrations in seawater decreased from 7.6 to 2.6 micrograms/l within 500 m of the station. All n-alkane values in seawater were within the limits of variation for oceanic waters proposed in 1992, although the distribution pattern suggested pollution from the station. The total PAH concentration in seawater varied between 110 and 216 ng/l. These values showed no trend with distance from the station and were all slightly higher than for the open ocean. The n-alkane and PAH concentrations in the surface sediment declined to low levels within 375 m of the station. This indicates that a large proportion of the hydrocarbons entering Factory Cove was deposited from the water column. Sediment n-alkane concentrations were similar at all depths of the cores when collected more than 125 m from the station. PAH levels in the sediment appeared to be due to local input, including a small spill in 1965. (Auth.)

J-48673

Green, G., Skerratt, J.H., Leeming, R., Nichols, P.D., **Hydrocarbon and coprostanol levels in seawater, sea-ice algae and sediments near Davis Station in eastern Antarctica: a regional survey and preliminary results for a field fuel spill experiment**, *Marine pollution bulletin*, 1992 25(9-12), p.293-302, 42 refs.

Sea-ice algae and seawater particulate matter samples showed a predominance of even chain n-alkanes. Hydrocarbon levels in sediment samples from anoxic fjord basins were high (45-48 microgram/g) compared to a sub-tidal marine sample (0.7 microgram/g), and were predominantly of bacterial origin. Contaminants detected were linear alkyl benzenes in sewage effluent from Davis Station, and polycyclic aromatic hydrocarbons (PAH) which were present in very low levels (parts per trillion) throughout the environment. High levels of 2,6-dimethylnaphthalene were found in anoxic sediment from Ellis Fjord, and may arise from a novel bacterial source. Coprostanol concentrations in sediments ranged from 67 to 1280 ng/g. A dual origin is proposed from marine mammalian faeces and, at several sites, from conversion of algal-derived sterols by anaerobic bacteria. Results for a hydrocarbon degradation experiment, where a light fuel was applied to an antarctic beach, showed loss of up to 99% of the fuel within 2 months, mainly by volatilization. (Auth. mod.)

J-48674

Kennicutt, M.C., Jr., Sweet, S.T., **Hydrocarbon contamination on the Antarctic Peninsula: III. The Bahia Paraíso--two years after the spill**, *Marine pollution bulletin*, 1992 25(9-12), p.303-306, 11 refs.

Two years after the release of 600,000 l of diesel fuel arctic into Arthur Harbor, little spill-related contamination can be detected in intertidal limpets (*Nacella concinna*) and subtidal sediments. Periodic releases of small amounts of material from the ship drift to nearby

islands, in particular the intertidal areas of Christine, Limitrophe and Humble Is. Subtidal sediment contamination is primarily due to other local inputs such as ship, boating and station activities. Beaches were unusually contaminated after 2 yrs, but quiescent weather conditions, occasional releases from the wreck, and prevailing currents may concentrate hydrocarbon contamination in relatively low energy areas. Intertidal limpets (*N. concinna*) collected along these beaches were also contaminated. The volatility of the fluid, the amount spilled, and the dynamic weather and current conditions in Arthur Harbor tended to minimize long-term contamination of the area. (Auth. mod.)

J-48680

Read, J.F., Pollard, R.T., **Structure and transport of the Antarctic Circumpolar Current and Agulhas Return Current at 40E**, *Journal of geophysical research*, July 15, 1993 98(C7), p.12,281-12,295, 37 refs.

Hydrographic data are presented from a near-meridional section across the Agulhas Return Current, the Subtropical Front and the Antarctic Circumpolar Current in the Southwest Indian sector of the southern ocean. The location and characteristics of the fronts are examined and the water masses are defined. The Agulhas Return Current emerges as a strong current as far east as 40E which forms a marked front that is separate from the Subtropical Front, and can be distinguished by a separate water mass. Eddies are seen to be an important feature of the Subantarctic Zone where they help to modify the water masses. Antarctic Intermediate Water appears in two forms, a saline (34.4) Indian Ocean variety and a fresh (34.2) Atlantic Ocean variety. The Atlantic variety is freshest at the Polar Front, and occupies the southern half of the Subantarctic Zone. Within the eddies, in the central Subantarctic Zone, there is interleaving between these two forms of Antarctic Intermediate Water. North Atlantic Deep Water is unable to cross the Southwest Indian Ridge but can pass south of the Crozet Plateau in the form of Circumpolar Deep Water, which is slightly more saline (34.75) than at Drake Passage (34.73). (Auth. mod.)

J-48727

Leynaert, A., Nelson, D.M., Quéguiner, B., Tréguer, P., **Silica cycle in the antarctic ocean: is the Weddell Sea atypical**, *Marine ecology progress series*, June 3, 1993 96(1), p.1-15, 61 refs.

The lowest biogenic silica production rates in the southern ocean (average of 2.59 mmol Si/sq m/d) have been recorded in an area of heavy ice cover along a transect through the Weddell Sea from Joinville I. to Cap Norvegia (Nov.-Dec. 1990). The associated biomass was also very low (concentrations 0.6 mmol/l for biogenic silica and 0.8 microg/l for chlorophyll *a*). Based upon these direct measurements of biogenic silica production rates and other data available from the marginal ice zone and open ocean areas, the estimated annual production of biogenic silica in the northern Weddell Sea is 810 to 870 mmol/sq m/yr. This leads to a revised estimate of the total annual biogenic silica production in the southern ocean of between 11 and 32 Tmol Si/yr. Comparing this annual production estimate to previous estimates of vertical flux of opal in the Weddell Sea, the authors conclude that no more than 1% of the silica produced annually by phytoplankton in the upper water column reaches a depth of 800 m. This is consistent with the general distribution of high accumulation rates of opal in southern ocean sediments which evidence an unexplained gap in the Weddell Sea. Thus, regarding the cycling of biogenic silica in the southern ocean, the Weddell Sea appears to be atypical. (Auth. mod.)

J-48760

Hodell, D.A., **Late Pleistocene paleoceanography of the South Atlantic sector of the southern ocean: Ocean Drilling Program hole 704A**, *Paleoceanography*, Feb. 1993 8(1), p.47-67, 74 refs.

Isotopic and sedimentologic data from Ocean Drilling Program hole 704A suggest that isotopic stages 7, 9, and 11 were marked by unusually strong interglacial conditions in surface waters of the southern ocean. During interglacial stages 9 and 11, warm surface waters penetrated far poleward and may have led to destabilization of the West Antarctic Ice Sheet. In contrast, the strongest glacial conditions in surface waters of the subantarctic South Atlantic occurred during oxygen isotopic stage 12. Comparisons of benthic carbon isotopic gradients between sites located in the North Atlantic, southern ocean, and Pacific indicate that the production of upper North Atlantic Deep Water (uNADW) was strongest during stages 7, 9, and 11 and weakest during stage 12. These results suggest a possible link between the flux of uNADW and paleoceanographic change in the southern ocean, and support the traditional NADW-antarctic connection whereby increased NADW leads to warming of the southern ocean. (Auth.)

J-48762

Lu, C.C., Xu, H.Z., Hao, X.H., Ni, Z.H., **Studies on gravity tides in King George Island, Antarctica**, *Science in China*, Mar. 1993 36(3), p.350-357, 16 refs.

By utilizing an LCR-G gravimeter, 342-day available gravity tide observations were obtained at King George I. Analytical results show that mean errors of tidal factor and phase delay for main waves are less than 0.6% and 0.3 deg respectively. By using the Schwiderski cotidal map to make oceanic tide corrections, it is found that the effect on M2 waves by oceanic tide reaches 20% of body tide magnitude, and leading phase is 6.7 deg. The obtained gravity tidal factors of this region are given. (Auth. mod.)

J-48844

Jeandel, C., **Concentration and isotopic composition of Nd in the South Atlantic Ocean**, *Earth and planetary science letters*, June 1993 117(3/4), p.581-591, 40 refs.

Profiles of the concentration and isotopic composition of Nd are presented for the South Atlantic Ocean. Concentrations range from 8 pmol/l at the surface to 28-38 pmol/l in deep waters. The Nd isotopic composition is more radiogenic in the South Atlantic than in the North Atlantic. The evolution of Nd concentration and isotopic composition within a given water mass appears to be largely dominated by mixing on the scale of the entire Atlantic Ocean. $\epsilon_{Nd}(0)$ values as high as -6.2 observed at intermediate depths (800-1000 m) in the southeast Atlantic and in Upper Circumpolar Water (150-1500 m) probably trace waters returning from the Pacific Ocean. This could argue in favor of the recent hypothesis that cold water return in the Drake Passage plays a significant role in closing the global thermohaline circulation. (Auth. mod.)

J-48845

Rudels, B., **High latitude ocean convection**, NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.323-356, 57 refs.

DLC QB500.5.F56

The main part of the world ocean deep waters is formed by heat loss at high latitudes. In contrast to the thermal winter convection occurring over most of the oceans, the thermohaline forcing in the polar areas is dominated by freezing and melting. The density changes are due to variations in salinity rather than in temperature. The characteristics of the created waters depend upon topographic conditions, the nature of the ice cover and the ambient water masses. In this paper, four areas of deep and bottom water formation are identified: the shelves of the Arctic Ocean; the shelf areas around the antarctic continent; the Weddell Sea; and the Greenland Sea. These areas

represent two types: boundary and open ocean convection. The different areas are presented in order of increasing complexity of the possible active processes. (Auth. mod.)

J-48846

Schmalzl, J., Hansen, U., **Dynamics of subcritical double-diffusive convection in the southern ocean: an application to polynyas**, NATO Advanced Study Institute on Dynamic Modeling and Flow in the Earth and Planets, Fairbanks, AK, June 17-28, 1991. Flow and creep in the solar system: observations, modeling and theory. Edited by D.B. Stone et al, NATO Advanced Science Institute, Series E. Applied Sciences. Vol.391, Dordrecht, Kluwer Academic Publishers, 1993, p.371-383, 23 refs.

DLC QB500.5.F56

This paper investigates the nature of subcritical double diffusive convection in the southern ocean with a time dependent two-dimensional finite-element method based on stream-function, compositional and temperature fields. The initial and boundary conditions are chosen with special respect to open-water polynyas, which play an important role in the heat budget and in the gas exchange of the antarctic ocean with the polar atmosphere. Results indicate that the initially layered period is important for the transport of heat and salt from the lower to the upper cold and fresh layer. Even under conditions which are stable in the static sense, overturning convection with a high heat transport rate was observed. (Auth. mod.)

J-48867

Kovalev, A.D., Chernega, G.A., Iakovlev, V.N., **Hydrometeorology of the southwestern Atlantic Ocean in 1987** [Nekotorye osobennosti gidrometeorologicheskikh uslovii v zapadnoi chasti atlanticheskogo sektora IUzhnogo okeana v 1987 g.], *Antarktika; doklady komissii*, 1992 No.30, p.26-30, In Russian with English summary. 2 refs.

The anomalies of hydrometeorological processes in 1987 have been considered on the basis of field observation data in the western Atlantic zone of the Antarctic. It is suggested that these anomalies are caused by higher reiteration of southerly meridional transports in the region due to an intensified advection of cold water masses from the south. (Auth.)

J-48875

Belkin, I.M., Bochkov, V.A., Romanov, M.IU., **Hydrological fronts of the southern ocean, summer 1988-1989** [Gidrologicheskie fronty IUzhnogo okeana letom 1988-1989 gg.], *Antarktika; doklady komissii*, 1992 No.30, p.89-96, In Russian with English summary. 21 refs.

Data from monitoring of large-scale quasi-stationary (climatic) fronts of the southern ocean, obtained by continuous measurements of the waters' upper layer temperature and salinity during a cruise of *Akademik Fedorov* from Dec. 1988 to Apr. 1989 are presented. Along six crossings of the Antarctic Circumpolar Current (ACC) in the Atlantic, Indian and Pacific sectors of the southern ocean, three main climatic fronts were identified: the Subtropical Front (STF), the Subantarctic Front (SAF) and the Polar Front (PF). MBT drops along four crossings of the ACC have yielded the positions and characteristics of the thermal fronts as follows: between 150 and 173E, a double structure of the SAF and the PF was noted; between 6 and 12E, the STF southern edge meets with the SAF northern edge; South of New Zealand, a local subsurface anomaly has been observed which could be related to an intrathermocline eddy and the Antarctic Winter Water. (Auth. mod.)

J-48876

Soliankin, E.V., **Features of coastal circulation of eastern antarctic waters** [Osobennosti pribrezhnoï tsirkuliatsii v vostochnoï Antarktike], *Antarktika; doklady komissii*, 1992 No.30, p.97-104, In Russian with English summary. 20 refs.

The hydrological observations of R/V *Akademik Knipovich* (Mar. 1981), R/V *Ob* and R/V *Umitaka-Maru* (Jan.-Feb. 1957) have been used for characterizing the coastal circulation of the eastern Antarctic. The elements of the coastal westward current have been calculated by a dynamic method. The structure of the coastal westward current depends on the bottom topography and the coastline. The current core spreads along the continental slope. The current is most intense where the shelf winter water modification is absent. The exchange of mass and properties between the coastal current and the off-shore water is weak. The characteristic features of the coastal current are also seen in the plankton distribution. Thermohaline properties of the coastal water are described. The baroclinic shear is well pronounced. It is assumed that the primary barotropy of the antarctic coastal current is caused by inclination of sea level resulting from the Ekman drift. (Auth. mod.)

J-48877

Mikhaïlovskii, G.E., Ponomareva, L.A., **Influence of upwelling in southern gyres and in the Antarctic Divergence on plankton communities** [Vlianie pod"ema vod v vikhrakh IUzhnogo okeana i v zone Antarkticheskoi divergentsii na planktonnoe soobshchestvo], *Antarktika; doklady komissii*, 1992 No.30, p.105-117, In Russian with English summary. 13 refs.

Primary data from plankton samples, and the results of their treatment, were obtained in 1982/83 during the 30th cruise of R/V *Dmitry Mendeleev* in the Pacific sector of the southern ocean. Statistical treatment of these data has included correlation analysis and calculation of such parameters as complexity, stability, rigidity and organization of the planktonic community. The results show that the Antarctic Divergence zone is a region of high biological productivity and that the upfolding of temporal (seasonal) structure of the planktonic community onto a spatial one is typical of the upwelling regions. There are some areas with higher productivity in the Antarctic Convergence zone, to the east from the submarine mountain range of Macquarie I., which correspond to the local upwellings in the cyclonic gyres characteristic of this region. It is concluded that the southern ocean contributes significantly to the primary productivity of the world ocean.

J-48962

Kuhn, G., Weber, M.E., **Acoustical characterization of sediments by Parasound and 3.5kHz systems: related sedimentary processes on the southeastern Weddell Sea continental slope, Antarctica**, *Marine geology*, Aug. 1993 113(3/4), p.201-217, 49 refs.

Subbottom profiling was performed during four FS *Polarstern* expeditions to the southeastern Weddell Sea continental slope, northwest of Lyddan Ice Rise. Analog records from high-resolution seismic reflection systems were used to classify sediment echo types. A comparison between the two systems shows the advantage of the *Parasound* system. Ten discrete sediment echo patterns were distinguished. Their regional distribution and the depth of acoustic signal penetration into the sediment were mapped. SW-NE trending sediment ridges with channels running parallel on the southeastern side of the ridges were traced in the eastern part of the study area. The prolonged and highly reflective echo types of the channel bottoms indicate deposition of predominantly coarse-grained sediments affected by erosional processes. These channels are interpreted as drainage systems for bottom water currents derived from the shelf and

steep upper slope. The flow direction is towards the northeast, counter to the Weddell Gyre. In contrast, the sediment ridges show up to 80 m subbottom penetration and an echo type of distinct multi-layered reflectors running parallel to subparallel with the surface reflector. The sediments of the ridges are interpreted to be "levce"-sediments, overspilled from the channels and preferentially deposited on the northwestern flank due to the Coriolis force. (Auth. mod.)

J-48963

Cripps, G.C., **Baseline levels of hydrocarbons in seawater of the southern ocean: natural variability and regional patterns**, *Marine pollution bulletin*, Feb. 1992 24(2), p.109-114, 7 refs.

In order to use the southern ocean as a barometer for global changes and in local pollution monitoring, clearly defined baselines are needed. This analysis addresses the need through sampling sea water in three categories: uncontaminated antarctic sites (Bransfield Strait, the Weddell-Scotia Seas confluence, Gerlache Strait); sites north of the Antarctic Convergence (open ocean); and potentially contaminated inshore sites (South Georgia and Signy Island). The analysis shows that it is possible to provide an estimate of the natural hydrocarbon baseline which is independent of water mass. Contaminated sites can be resolved by profiles for PAHs and probably for n-alkanes. The baseline comprises the natural variation on which threshold limits have been established for n-alkanes and PAHs.

J-49033

Artegiani, A., Paschini, E., Andueza Calderon, J., **Physical oceanography of the Straits of Magellan**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.11-52, 4 refs.

The stations occupied during the cruise were similar to those of Hero 72-5 and Hudson-70. Information from sampling stations for Magellan 91 is organized into tables showing XBT launches and CDT stations; the salinity, temperature, depth data are graphed.

J-49034

Catalano, G., Goffart, A., **Dissolved oxygen and nutrients in the Straits of Magellan**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.53-65, 3 refs.

The chemical characteristics of the Strait are presented in table and graph forms as the vessel moves from the Pacific to the Atlantic openings. Twenty-two hydrological stations were occupied during this phase of the voyage and samples of O₂, PO₄, NO₃, NO₂, and NH₄ were collected. The deeper and narrower western part of the Strait differs from the eastern part by a strong vertical gradient of chemical properties at a depth of about 100 m and by showing less oxygen and more nitrate plus nitrite. The Pacific-Atlantic waters demarcation point occurs vividly at about 125 mi from the Pacific opening.

J-49035

Carrada, G.C., **Spatial distribution of photosynthetic pigments in the Straits of Magellan**, Straits of Magellan Oceanographic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography, Genova, 1991, p.67-87, 5 refs.

Sea water sampling in the Strait of Magellan was done on a continuous basis to determine the vertical and horizontal distribution of photosynthetic pigments in its overall biomass. A brief outline is given of procedures used in gathering, processing, measuring, analyzing, extracting and storing the samples.

J-49065

Fahrbach, E., **Circulation and water mass modification in the Weddell Sea**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.14-16.

DLC G890.F55R47

The thermohaline circulation of the global ocean is driven to a large extent by water mass modifications that take place in the northern and southern Atlantic Ocean and its adjacent seas. South of the Antarctic Circumpolar Current, density layers influenced by the North Atlantic are shallow and they consequently lose large quantities of heat to the atmosphere. This occurs both through direct contact of the upper ocean/sea ice layer with the atmosphere or indirectly by conduction through the quasi-permanent ice shelves. Such heat losses initiate processes that produce cold and dense water masses, with the most important being formed in the Weddell Sea, which in turn recirculate back toward the north at abyssal depths as various forms of Antarctic Bottom Water. In this presentation, measurements made during the ongoing multinational Weddell Gyre Study are used to make preliminary estimates of the mass, heat and salt transports in the Weddell Sea.

J-49070

Doake, C.S.M., **Gravimetric tidal measurements on Filchner Ronne Ice Shelf**, Filchner-Ronne Ice Shelf programme, Report No.6 (1992), edited by H. Oerter, Bremerhaven, Alfred Wegener Institute for Polar and Marine Research, 1992, p.34-39, 7 refs.

DLC G890.F55R47

Worden gravimeters were used at two sites on Ronne Ice Shelf to measure tidal motion during the 1991/92 season. At the mouth of Rutford Ice Stream, about 20 km downstream from a grounding line around a surface knoll, a 4 day record (Jan. 3-6, 1992) was obtained at approximately hourly intervals. At the hotwater drill site a record spanning 16 days was obtained (Jan. 6-21, 1992), with unbroken hourly records over a nine day period. The records were converted first to mgals and then to tidal displacement in meters.

J-49086

Lisitsyn, A.P., **Terrigenous sedimentation processes in seas and oceans** [Protsessy terrigennoï sedimentatsii v moriakh i okeanakh], Moscow, Nauka, 1991, 270p. + 2 fold. maps, In Russian. Refs. p.252-270.

Laws governing the quantitative distribution and composition of sedimentary material are derived from the results of studies of suspended matter, sedimentary material fluxes, studies from submersibles, deep-sea drilling and geophysical data for northern and southern regions, including Antarctica. Generalizations are made from the data on river discharge, matter transformation on the river-sea barrier, biodifferentiation, and deposition in the pelagic ocean. Four types of zonality determining recent and ancient sedimentation processes are distinguished. Chemical and mineral composition and historical features of sedimentation for the last 150 million years are discussed. (Auth. mod.)

J-49089

Foster, T.D., **Convection studies**, University of California, Santa Cruz. Report, Jan. 23, 1993 UCSC-1993001, 4p., ADA-265 578, Final report Jan. 1, 1988-Dec. 31, 1992. 7 refs.

An experimental and theoretical investigation of convection at high Rayleigh numbers was carried out with the goal of trying to understand the role that convection plays in oceanic mixing processes. Numerical models were constructed that solved the two-dimensional Navier-Stokes and heat conduction equations under the same conditions as those experiments on constant heat-flux convection and for

the cabling instability. For constant heat flux it was found that at high Rayleigh numbers there were two length scales, the thickness of the thermal boundary layer and the total depth of the fluid layer. This seems to be consistent with the thermal patterns, which had a length scale of approximately the mixed layer depth at the ocean surface, found using an infrared scanner from an airplane. The cabling simulations seem to be fairly accurate representations of the laboratory experiments. The comparison of the cabling instability to oceanic phenomena is continuing, but preliminary results indicate that it may be important in the Antarctic. (Auth.)

J-49092

Flegal, A.R., Maring, H., Niemeyer, S., **Anthropogenic lead in antarctic sea water**, *Nature*, Sep. 16, 1993 365(6443), p.242-244, 26 refs.

Antarctica is believed to be a relatively pristine continent, mainly because of its remote location and the atmospheric circulation patterns that limit the transport of industrial aerosols into the antarctic polar cell. This perception is apparently supported by the extremely low concentrations of lead in antarctic surface waters—an observation that has been interpreted as showing insignificant contamination by anthropogenic lead. The isotopic composition of lead in other natural waters has been used as a tracer of the sources of lead, and in particular to identify anthropogenic inputs. This approach was applied to antarctic surface waters, and it shows that despite the low concentrations of lead in these waters, their isotopic composition reveals a significant contribution of lead from industrial sources. The extremely low concentrations of lead in these waters appear to be due to biological scavenging of the lead during periods of intense primary production. (Auth. mod.)

J-49096

Smith, N.R., **Ocean modeling in a global ocean observing system**, *Reviews of geophysics*, Aug. 1993 31(3), p.281-317, Refs. p.311-317.

The ocean community is presently contemplating the conceptual design of a long-term systematic observing system to monitor, describe, and understand the physical and biogeochemical properties that determine ocean circulation and the seasonal to decadal climate changes in the ocean, and to provide the observations needed for climate prediction. This paper presents one view of the role of modeling in the development and implementation of the climate aspect of that observing system. Polar ice sheets and the southern ocean are included in the discussion. (Auth. mod.)

J-49102

Gurgul, H., Stochmal, W., Szymczak, W., Rakusa-Suszczewski, S., **Spatial and seasonal changes of transparency in waters of the Admiralty Bay (King George Island, South Shetland Islands, The Antarctic)**, *Polskie archiwum hydrobiologii*, 1992 39(1), p.1-13, With Polish summary. 18 refs.

Transparency changes in Admiralty Bay waters were tested with a Secchi disk between Feb. 4, 1989 and Jan. 26, 1990. Transparency ranged from 0.8 to 9.0 m in the summer season and 6.5 to 17.0 m in the winter. Dependence of transparency changes on air temperature and precipitation was investigated. Transparency shows strong negative correlation with temperature and weak dependence on precipitation. The lowest level of transparency occurred in fiords where the replacement of water from the ocean is more difficult, especially offshore near glaciers. The light attenuation coefficient spectrum was measured. Its shape shows low concentration of yellow substances and high concentration of mineral suspension. (Auth. mod.)

J-49104

Zielinski, U., **Quantitative estimation of palaeoenvironmental parameters of the antarctic surface water in the Late Quaternary using transfer functions with diatoms** [Quantitative Bestimmung von Paläoumweltparametern des Antarktischen Oberflächenwassers im Spätquartär anhand von Transferfunktionen mit Diatomeen], *Berichte zur Polarforschung*, 1993 No.126, 148p., In German with English summary. Refs. p.89-102.

In this study, transfer functions were developed from diatom census data of surface sediment samples from the Atlantic sector of the southern ocean. A reference data set was created which was then correlated to hydrographic conditions of the surface water statistically. The raw data set includes 178 samples with 85 diatom species and species groups, two silicoflagellate species, and chrysophycean cysts. For the statistical analysis the diatoms were first reduced to 34 species. After a factor analysis, four factors (assemblages) could be distinguished. It was evident that the signal of the less abundant but ecologically important species were being masked by the highly abundant dominant species *Nitzschia kerguelensis*. This restrained a good correlation between the factors and the surface water hydrology and made further data modification necessary. After factor analysis and reduction of the data set, an antarctic reference data set was produced with 130 samples and 30 diatom species and species groups. Factor analysis revealed three assemblages, which could be correlated with distinct areas of different surface water temperatures in the study area. The resting spores show, as do the ice diatoms, a maximum relative abundance within the glacial periods. The reference data set presented here contains a wider range of data for creating transfer functions and palaeoecological reconstructions downcore. (Auth. mod.)

J-49150

Printer's corrigendum, *Journal of marine research*, May 1993 51(2), p.445-446, For the paper being corrected see J-48976.

The corrigendum pertains to Locarnini, R.A. et al, *The importance of the Scotia Sea on the outflow of Weddell Sea Deep Water*, *Journal of marine research* 51(1):135-153, Feb. 1993. Specifically, Figs. 1, 2, and 7 were unsatisfactory due to insufficient contrast in shading between oceanic and continental areas, and are replaced herewith.

J-49156

Stein, M., **Data report on temperature, salinity and dissolved silicate off the Antarctic Peninsula during SIBEX 1983-1985**, *Biological Investigations of Marine Antarctic Systems and Stocks. BIOMASS report series*, Dec. 1992 No.68, 71p., 3 refs.

Vertical profiles on temperature, salinity and dissolved silicate obtained during SIBEX 1 and 2 by RVs *Polarstern*, *John Biscoe*, and *Walter Herwig* are discussed. Data collected at different distances from the stations are presented in section graphs. Location of the individual sections are shown in a figure.

J-49180

Fahrbach, E., **Circulation and water mass formation in the Weddell Sea** [Zirkulation und Wassermassenbildung im Weddellmeer], *Die Geowissenschaften*, July 1993 11(7), p.246-253, In German with English summary. 23 ref.

The thermohaline circulation of the global ocean is primarily driven by water mass formation in the northern and southern Atlantic Ocean and its adjacent seas. Lateral and vertical mixing in the northern North Atlantic generate the North Atlantic Deep Water which

occupies the major part of the world oceans. The oceanic bottom layer is filled with Antarctic Bottom Water which is mainly formed in the Weddell Sea. Physical reasoning indicates that sea ice generation as well as thermal interaction of the large ice shelves with Weddell Sea water may likewise initiate a sequence of processes to produce bottom water. In the framework of the ongoing international Weddell Gyre Study, preliminary estimates of the mass, heat and salt transports have been derived from measurements. These values agree by and large with results of model calculations which have been obtained under the prerequisite that sea ice effects are taken into account. The latter model simulations distinctly indicate that the annual sea ice cycle in the Weddell Sea leads to a remarkable enhancement of the Weddell Gyre circulation and of the Antarctic Circumpolar Current. Numerical model experiments show that the melting and freezing processes under the Filchner-Ronne Ice Shelf may create enough cold Ice Shelf Water as to finally generate the major amount of the Antarctic Bottom Water. (Auth.)

J-49191

Fettweis, M., Yu, C.S., **Numerical experiments of convection-diffusion dominated flow problems and open boundary conditions in finite difference models**, Ocean waves mechanics, computational fluid dynamics, and mathematical modelling: proceedings of the Eleventh International Annual Conference of the Canadian Applied Mathematics Society, May 29-June 1, 1990, Halifax, Nova Scotia, Canada, edited by M. Rahman, Southampton, Boston, Computational Mechanics Publications, 1990, p.409-416, 10 refs.

DLC GC213.7.M3C36 1990

The purpose of this paper is to implement and validate some advection schemes and open boundary conditions (OBC). The results of these experiments will be used for further development of a 2.5D (3D) model for the Weddell Sea. The model used to carry out the numerical experiments solves the non-dimensional form of the Navier-Stokes equations by means of the artificial compressibility method. The idea of this method consists in finding the steady state solution using the unsteady state equations in the limit when time tends to infinity, i.e. the solution has only a physical meaning at convergence. The advection terms are approximated by a first-order upstream or a third-order QUICK scheme. The open boundary condition (OBC) is based on the Orlanski approach of the Sommerfeld radiation condition. Finally, the results of the model are discussed. The backward facing step problem has been chosen as a test case. (Auth.)

J-49202

Fabiano, M., Povero, P., Medica, D., **Italian Antarctic Expedition 1989-90: preliminary observations on particulate organic matter**, *Memorie di biologia marina e di oceanografia*, 1990 18(1), p.29-38, 10 refs.

The preliminary results of a study on total suspended matter, carbohydrates, proteins and lipids in particulate matter collected (POM) in the antarctic waters of the Ross Sea (Terra Nova Bay) are discussed. The data show high particulate organic matter values with a main protein component in coastal waters. The variation of POM composition with depth is considered. (Auth. mod.)

J-49270

England, M.H., **Representing the global-scale water masses in ocean general circulation models**, *Journal of physical oceanography*, July 1993 23(7), p.1523-1552, 67 refs.

A hierarchy of coarse-resolution World Ocean experiments is integrated with a view to determining the most appropriate representation of the global-scale water masses in ocean general circulation models. The largest-scale response of the simulated ocean to the pre-

scribed forcing in each model run is described. Model forcing at the sea surface is derived from climatological fields of temperature, salinity, and wind stress. The first experiment begins with a quite unrealistic and idealized World Ocean. Sixteen subsequent experiments then employ more realistic surface boundary conditions, model geometry, and internal physical processes. A fundamental dynamical constraint in the Drake Passage gap appears to limit the outflow rate of bottom water in the Antarctic region by decoupling the extreme antarctic waters from the rest of the World Ocean. A surface wind stress also acts to decouple the two hemispheres by limiting near-surface meridional flows across the equator. In the Atlantic basin, this decoupling becomes negligible when North Atlantic Deep Water (NADW) production is simulated. The representation of low salinity Antarctic Intermediate Water (AAIW) is sensitive to the level of horizontal diffusion employed by the model, as well as the chosen geometry of the Drake Passage gap and the amount of buoyancy provided by the model's deep water. The inclusion of an isopycnal mixing scheme improves the representation of AAIW in coarse-resolution models. (Auth. mod.)

J-49292

Grobe, H., Huybrechts, P., Fütterer, D.K., **Late Quaternary record of sea-level changes in the Antarctic**, *Geologische Rundschau*, July 1993 82(2), p.263-275, 56 refs.

The Late Quaternary sediment sequence of the continental margin in the eastern Weddell Sea is well suited for palaeoenvironmental reconstructions. Two cores from the upper slope, which contain the sedimentary record of the last 300 ky, have been sedimentologically investigated. Age models are based on lithostratigraphy and are correlated with the stable isotope record. As a result of a detailed analysis of the clay mineral composition, grain size distributions and structures, this sedimentary record provides the first marine evidence that the antarctic ice sheet extended to the shelf edge during the last glacial. The variations in volume and size of the ice sheet were also simulated in numerical models. The model revealed that fluctuations are primarily driven by changes in eustatic sea-level and that the ice edge extended to the shelf edge during the last glacial maximum. This causal relationship implies that the maximum ice extension strongly depends on the magnitude and duration of the sea-level depression during a glacial period. The results of the sedimentological investigations and of the numerical models show that the antarctic ice sheet follows glacial events in the Northern Hemisphere by teleconnections of sea level. (Auth. mod.)

J-49300

Ohshima, K., Takizawa, T., Kawamura, T., Ushio, S., **Seasonal variations of the flow and oceanic structure under fast ice in Lützow-Holm Bay, Antarctica**, International Symposium on Okhotsk Sea and Sea Ice, 8th, Mombetsu, Hokkaido, Japan, Feb. 1-5, 1993. Abstracts, Mombetsu, Okhotsk Sea and Cold Ocean Research Association, 1993, p.251-254, 3 refs.

Observations conducted by the Japanese Antarctic Climate Research project in Lützow-Holm Bay, May 1990-Jan. 1992, indicate that the current flows with a typical value of 0.1 m/sec, southward from the open ocean to the fast ice region along the slope of a glacial trough. The exchange rate between the open water and the fast ice water is on the order of one month. In fall, the accumulation of upper fresh water becomes maximum. From spring to summer, the thickness of the upper fresh cold layer becomes minimum. In fall, the Circumpolar Trough shifts towards the antarctic continent and the low pressure causes the westward wind to become strong and pile up the upper fresh cold water in the coastal oceans. From spring to summer, the Circumpolar Trough shifts northward and the westward wind weakens, so that the effect of piling up is reduced and the upper fresh cold layer becomes thin. The Antarctic Coastal Current appears to

have a maximum westward velocity in fall and minimum velocity in summer, which may be the results of seasonal shift of the Circumpolar Trough.

J-49309

Zwierz, M., **Cruise ANTARKTIS X/3 of RV *Polarstern*: CTD-report**, *Berichte zur Polarforschung*, 1993 No.128, 84p., 3 refs.

One of the scientific aims of the ANT X/3 expedition was the investigation of the Antarctic Slope Front in the Weddell Sea. A grid of 66 CTD stations was occupied in the Eastern Weddell Sea between the Atka Bight and Kap Norvegia from Apr. 6-May 2, 1992. All CTD stations are listed with position, time, maximum depth of the CTD profile and water depth. It includes the test station (No.334) outside the frontal zone. CTD measurements were performed with two Salzgitter Bathysonde units. The first one (stations 334-410) was Bathysonde 2000LS S/MT 122, the second (stations 412-475) was Bathysonde 2000LS S/MT 121. The sensor accuracies of these instruments, according to Salzgitter GmbH, are shown. The first part of standard processing of the CTD data was done with the CTD Data Acquisition Software to eliminate salinity spikes from the records. Sampling intervals, temperature and conductivity were aligned in time relative to pressure and filtered with a low pass filter. Then the profile data were averaged over 0.5 dbar intervals. After this procedure, salinity was computed from conductivity temperature and pressure. Because not all spikes were removed after this procedure, temperature and salinity were re-filtered with a median filter (7 points) and again with a moving average filter (9 points). *In situ* comparisons of CTD data with water samples and reversing thermometer were performed at 8 stations. The salinity of water samples was measured, average temperature differences between the CTD and the thermometer readings were figured, and calibration coefficients were determined. (Auth. mod.)

J-49312

Crespi, V.C., **Trace elements distribution in antarctic sediments by neutron activation analysis**, *Journal of radioanalytical and nuclear chemistry*, Feb. 1993 168(1), p.107-114, 8 refs.

Iron and trace elements were determined by instrumental neutron activation analysis in a number of sea bottom sediment samples collected in the Ross Sea and close to the Italian station at Terra Nova Bay. A full listing of results is presented and discussed as well as the evaluation of precision and accuracy. In order to find correlations and similarities among the sediment samples, the analytical data were given statistical treatment. In addition, rare earth element patterns were obtained. Typical trends were observed with no evident Eu negative anomaly and a depletion of heavy rare earth elements. (Auth.)

J-49341

Ledbetter, M.T., Bork, K.R., **Post-Miocene fluctuations of Antarctic Bottom Water paleospeed in the southwest Atlantic Ocean**, *Deep-sea research*, 1993 40(4/5), p.1057-1071, Refs. p.1068-1071.

A gap in the Falkland Escarpment serves as the primary channel through which Antarctic Bottom Water (AABW) flows into the Argentine Basin from the Georgia Basin. The particle-size distributions of the biogenic-free silt fraction in four cores near the Falkland Gap, and the hiatus frequency at water depths greater than 4000 m throughout the southern ocean, are used to infer post-Miocene AABW paleospeed. Analysis of AABW paleocirculation indicates episodes of increased bottom-current speeds at: 5.3-4.5; 4.0-3.5; 3.3-3.1; 2.5-2.3; 2.0-1.5; and 1.0 Ma. These fluctuations in inferred paleospeed are compared to both northern and southern hemisphere paleoceanographic and paleoclimatic events in order to examine the response of bottom-water circulation to post-Miocene climates. The authors

speculate that the periods of enhanced bottom-water activity may have been responsible for major episodes of mudwave growth that began after the Late Oligocene and have persisted into the Holocene. (Auth. mod.)

J-49390

Italy, National Scientific Commission for Antarctica, **Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography**, Genoa, 1992, 507p., Refs. passim. For individual papers see B-49394, B-49396 through B-49402, I-49392, J-49391, J-49393 and J-49395.

This volume contains a collection of 12 reports based on physical, chemical and biological studies carried out during the 1989-1990 *Cariboo* cruise in the South Pacific Ocean, along a transect from the Campbell Plateau to Terra Nova Bay. The resulting data are presented in numerous tables and graphs.

J-49391

Artegiani, A., Azzolini, R., Paschini, E., Creazzo, S., **Physical oceanographic conditions in the southern Pacific Ocean and in the western Ross Sea**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.5-62, 6 refs.

The bulk of this report consists of tables of data collected at 27 stations, located in the South Pacific Ocean between 50 and 75S, during the *Cariboo* cruise of 1989-1990. The tables show the following: number of the station, its coordinates, date, depth at which the water samples were collected, and pressure, temperature, salinity and chemistry values of the samples.

J-49393

Fabiano, M., **Particulate organic carbon, nitrogen and nucleic acids (DNA, RNA) in antarctic waters (Ross Sea and Terra Nova Bay)**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.79-106, 12 refs.

Data from water samples collected in Antarctic Convergence waters and the Ross Sea between Nov. 23, 1989 and Jan. 7, 1990, and in Terra Nova Bay between Jan. 11 and Feb. 4, 1990, are presented in 12 tables and 13 figures. The aim of the research was to study the particulate organic matter in relation to the distribution of planktonic organisms. Methods used in analyses of particulate organic carbon and nitrogen, and the extraction and measurement of the nucleic acids DNA and RNA, are described.

J-49395

Hecq, J.H., Goffart, A., **Results of phytopigments analysis by high performance liquid chromatography (HPLC) during the 5th Italian Antarctic Expedition**, Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography, Genoa, 1992, p.123-152, 7 refs.

Preliminary observations are given of phytoplanktonic pigments measured by HPLC in the waters north and south of the Antarctic Convergence, the region of Antarctic Divergence and Balleney Is., and along the southern transect of the *Cariboo* cruise in the Ross Sea. Tabulated results are presented.

J-49436

Francois, R., Altabet, M.A., Burckle, L.H., **Glacial to interglacial changes in surface nitrate utilization in the Indian Sector of the southern ocean as recorded by sediment $\delta^{15}\text{N}$** , *Paleoceanography*, Oct. 1992 7(5), p.589-606, 65 refs.

A new approach for paleoceanographic reconstruction of surface nutrient utilization in the southern ocean is described. It has been observed in the contemporary ocean that during photosynthesis the $\delta^{15}\text{N}$ of planktonic organic matter increases with increasing nitrate depletion in surface waters. Results demonstrate that the $\delta^{15}\text{N}$ signal produced in surface waters is reflected in the underlying surface sediments; core top $\delta^{15}\text{N}$ is inversely correlated with surface nitrate concentration along a transect across the Subtropical Convergence and the Polar Front in the southeast Indian Ocean. These results are consistent with a four-box model showing that the nitrogen isotopic composition of sinking organic matter depends on percent nitrate utilization in the euphotic zone. By comparing the $\delta^{15}\text{N}$ of surface sediments with that measured in the glacial sections of several cores, changes are inferred in the intensity and latitudinal distribution of nitrate uptake in this region during the last glacial maximum. These preliminary results argue against increased biological uptake of nutrients in southern polar waters as a major mechanism for glacial lowering of atmospheric CO_2 . A six-box model is used to explore the possible impact of this observation on atmospheric CO_2 . (Auth. mod.)

J-49471

Dhargalkar, V.K., Verlencar, X.N., **Production of organic matter in antarctic sea shelf**, *Indian journal of marine science*, Mar. 1992 21(1), p.1-5, 25 refs.

DLC GC721.I48

Particulate organic matter (POM) collected from 3 discrete depths (0, 10 and 30 m) at a single station in the waters off the ice shelf of Princess Astrid Coast during 1986 was analyzed for phytoplankton biomass (as chl *a*), particulate organic carbon (POC) and constituent fractions. Chlorophyll *a* varied from 0.026 to 3.1 micrograms/l. POC ranged from 0.280 to 1850 micrograms/l and particulate carbohydrate (PCHO) from 8 to 193 micrograms/l. Large variations during summer signified patchy distribution. Phytoplankton population in 30 m deep water column during winter was dominated by unicellular blue green algal forms, while during spring, diatoms such as *Thalassiothrix longissima*, *Thalassiosira* sp. were dominant. Sea-ice microalgal communities showed dominance of diatoms, with dinoflagellates poorly represented. The cell count varied, with lowest counts during winter. In the zooplankton communities copepods were dominant in all months, averaging 24.985%. The maximum zooplankton density of 2280 per 100 m³ was observed in Dec. Significant correlation was observed between POC and chl *a* and PL at 10 m depth. Variation in POC was due to variation in community structure, composition and production of the sea-ice algae and phytoplankton in the water column during different months. (Auth.)

J-49472

Verlencar, X.N., Dhargalkar, V.K., **Primary productivity and nutrients in the Indian sector of the southern ocean**, *Indian journal of marine science*, Mar. 1992 21(1), p.6-12, 42 refs.

DLC GC721.I48

Hydrography, nutrient and biological productivity data collected from 1981 to 1986 in the Indian sector of the southern ocean between 11 to 53E longitude are reported. The physical processes are most active in this region, with nutrient rich water upwelling at the Antarctic Divergence (AD) at 65S and water downwelling at the Antarctic Convergence (AC) or Subtropical Convergence (STC) to the north. Chlorophyll *a*, primary productivity and zooplankton estimations suggest that the regions south of AC are more productive than others. Higher productivity at the continental ice-edge than in oceanic waters is accounted for by the stability of the water column brought about by low salinity due to ice melting. Sharp depletion of Si near the AC where NO_3 and PO_4 maintain high values, as in the higher latitudes, reflects a unique behavior of this element (Si) as regards its biological uptake and regenerative mechanisms. Nutrient anomaly studies indicate that N regeneration is fast in surface waters, while most of the Si incorporated in diatoms and silicoflagellates tend to escape to deep-

er waters or to bottom sediment. The importance of microbial population is stressed in understanding the food chain dynamics of the antarctic ecosystem. (Auth.)

J-49480

Klöser, H., **Seasonal variation of algal growth conditions in sheltered antarctic bays: the example of Potter Cove (King George Island, South Shetlands)**, *Journal of marine systems*, Oct. 1993 4(4), p.289-301, Refs. p.299-301.

Wind, air temperature, surface irradiance, light penetration into the water, salinity and water temperature have been recorded from mid-Nov. to mid-Feb. in Potter Cove, King George I. Results are compared with published data on requirements for growth of antarctic macroalgae. The investigated season showed two distinct periods: early summer lasted until end of Dec. with comparatively cold temperatures, unstable water column and deep penetration of light; late summer started in early Jan. and was characterized by reduced salinity due to meltwater discharge and high turbidity due to suspended sediments. Meltwater influence did not sufficiently change salinity to be responsible for the frequently noted paucity of macroalgal communities in sheltered bays. Shading by suspended sediments was equally considered to be of minor importance, as macroalgae have their optimal growth phase from Sep. to Dec. During this period, light penetration and depth distribution of macroalgae coincide perfectly. From these results, a general review on depth limitation of macroalgae by light conditions is derived. (Auth. mod.)

J-49484

Owens, N.J.P., Turner, D.R., **Ocean-climate studies in the Antarctic**, *NERC news*, Apr. 1993 No.25, p.7-9.

Research carried out in the southern ocean on several cruises of two ships, the RRS *James Clark Ross* and the RRS *Discovery*, concerned with the role of the oceans in the cycling of the elements and related atmospheric exchanges with particular reference to carbon, is described.

J-49487

Mackensen, A., **DeltaC-13 in benthic foraminiferal tests of *Fontbotia wuellerstorfi* (Schwager) relative to the deltaC-13 of dissolved inorganic carbon in southern ocean deep water: implications for glacial ocean circulation models**, *Paleoceanography*, Oct. 1993 8(5), p.587-610, Refs. p.608-610.

On a transect between 20 and 70S in the eastern Atlantic Ocean and Weddell Sea, water samples from 19 hydrographic stations and bottom water from 55 surface sediment samples taken with a multiple corer were investigated for the stable carbon isotopic composition of the total dissolved inorganic carbon (*deltaC-13 SigmaCO2*). These measurements were compared to *deltaC-13* values determined on live specimens of the benthic foraminifer *Fontbotia wuellerstorfi* and closely related genera from the same stations. In addition, at 16 stations the stable carbon isotope composition of sedimentary organic carbon was measured. General deepwater and bottom-water mass circulation patterns as inferred from the *deltaC-13 SigmaCO2* are in close agreement with those known from other nonconservative tracers. Very low *deltaC-13* values of upper Circumpolar Deep Water (<0.3 per mill Pee Dee belemnite (PDB)) in the Polar Front region and the eastern limb of the Weddell Gyre coincide with nutrient maxima. However, a significant decoupling of the dissolved phosphate signal from the *deltaC-13 SigmaCO2* signal is indicated in the abyssal Weddell Sea. (Auth. mod.)

J-49488

Francois, R., Bacon, M.P., Altabet, M.A., **Glacial/interglacial changes in sediment rain rate in the SW Indian sector of subantarctic waters as recorded by Th-230, Pa-231, U, and *deltaN-15***, *Paleoceanography*, Oct. 1993 8(5), p.611-629, Refs. p.627-629.

High-resolution records of opal, carbonate, and terrigenous fluxes have been obtained from a high-sedimentation rate core from the Crozet Plateau by normalization to Th-230. This method estimates paleofluxes to the seafloor on a point-by-point basis and distinguishes changes in sediment accumulation due to variations in vertical rain rates from those due to changes in syndepositional sediment redistribution by bottom currents. The authors also measured sediment *deltaN-15* to evaluate the changes in nitrate utilization in the overlying surface waters associated with paleoflux variations. Results show that opal accumulation rates on the seafloor during the Holocene and stage 3, based on C-14 dating, were respectively tenfold and fivefold higher than the vertical rain rates. Correction for syndepositional sediment redistribution and the improved time resolution that can be achieved by normalization to Th-230 disclose important variations in opal rain rates. The authors found relatively high but variable opal paleoflux during stage 3, with two maxima centered at 36 and 30 kyr B.P., low opal paleoflux during stage 2 and deglaciation and a pronounced maximum during the early Holocene. (Auth. mod.)

See also:

B-47442 B-47452 B-47453 B-47454 B-47457 B-47463 B-47472
B-47474 B-47479 B-47525 B-47527 B-47528 B-47530 B-47532
B-47535 B-47607 B-47612 B-47636 B-47713 B-47717 B-47720
B-47750 B-47777 B-47863 B-47864 B-47865 B-47866 B-47867
B-47900 B-47913 B-47915 B-47917 B-48027 B-48039 B-48118
B-48153 B-48234 B-48295 B-48320 B-48324 B-48326 B-48331
B-48332 B-48357 B-48361 B-48402 B-48422 B-48427 B-48480
B-48481 B-48482 B-48489 B-48491 B-48510 B-48621 B-48631
B-48669 B-48675 B-48676 B-48677 B-48741 B-48742 B-48791
B-48797 B-48828 B-48857 B-48878 B-48880 B-48881 B-48882
B-48894 B-48898 B-48917 B-48958 B-48980 B-48983 B-49000
B-49036 B-49037 B-49038 B-49106 B-49116 B-49139 B-49140
B-49141 B-49142 B-49144 B-49145 B-49148 B-49175 B-49226
B-49227 B-49228 B-49266 B-49302 B-49350 B-49354 B-49355
B-49373 B-49379 B-49401 B-49434 B-49447 B-49449 C-48873
C-48874 C-48944 C-49069 D-48852 D-49032 E-47569 E-47663
E-47712 E-47754 E-47758 E-47761 E-47772 E-47773 E-47818
E-47819 E-47962 E-47975 E-47984 E-47985 E-48000 E-48044
E-48164 E-48286 E-48471 E-48524 E-48823 E-48827 E-48835
E-48839 E-48841 E-48843 E-49177 E-49195 E-49272 E-49277
F-47514 F-47706 F-47719 F-47771 F-47886 F-47938 F-48457
F-48536 F-48989 F-48990 F-49016 F-49057 F-49058 F-49062
F-49064 F-49071 F-49083 F-49203 F-49209 F-49311 F-49323
F-49475 F-49476 F-49477 F-49493 G-48678 G-48679 G-48942
I-47655 I-47721 I-48259 I-48265 I-48377 I-48906 I-49050
I-49093 I-49207 I-49448 L-48542 L-48966 L-49245

K. ATMOSPHERIC PHYSICS

K-47414

Gregori, G.P., Martellucci, S., **MHD pulsed generators in Antarctica—man-made production of magnetospheric substorms, and underground surveying: proposals and perspectives**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.351-359, 4 refs.

The practical possibility is discussed for operating MHD pulsed generators in Antarctica for application to geophysical investigations. The scientific aspects are concerned with aeronomy and solar-terrestrial relations (ionospheric effects and artificial generation of magnetospheric substorms), and with geoelectromagnetic survey of underground structures. The heuristic potentialities offered by the specific location of Terra Nova Bay inside the auroral oval are emphasized. (Auth.)

K-47415

Gregori, G.P., **Magnetospheric diagnostics by means of observations of polar auroras in Antarctica (electric field and plasma drift in the magnetosphere and in the polar ionosphere). Extended abstract**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.361-374, 9 refs.

The focus of this note is on auroras as a function of convection in the magnetosphere, electric field, plasma drift, etc. A few key points of present magnetospheric physics are reviewed, and a general reference is made to several authoritative books written on the subject. A full-length paper will follow.

K-47416

Meloni, A., Palangio, P., Palombo, B., Romeo, G., **Daily geomagnetic variation observed at Terra Nova Bay during 1986-90 summer expeditions**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.375-383, 19 refs.

The focus of this article is on upper atmospheric features related to the geomagnetic field daily variations observed in Terra Nova Bay during 4 austral summers. It is shown that the current system that causes the daily magnetic field variation indicates a significant solar cycle effect in Terra Nova Bay, and that the solar cycle effect on geomagnetic daily variation in Antarctica, in comparison with mid-latitude station geomagnetic variations, is stronger than previously observed. (Auth. mod.)

K-47417

De Franceschi, G., Bianchi, C., Gregori, G.P., Zolesi, B., **"Calorimetric" vs. "instant" phenomena: a proposal for ionospheric research in Antarctica**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.34, Bologna, Italian Physical Society, 1992, p.385-390, 13 refs.

In a proposal to study the planetary pattern in Terra Nova Bay, the following is pointed out: solar-terrestrial relations imply both "instant" effects (by which a given phenomenon is produced almost instantaneously following the cause triggering it), and "calorimetric" phenomena (by which the Earth's physical system stores energy for a while, under some suitable form, that later decays with some given time constant); the relative importance of the roles of the two kinds of phenomena depends on space and time. The time dependence is

basically controlled by solar activity plus the complicated mutual interaction between ionosphere and magnetosphere, by which energy and/or particles are eventually stored somewhere, to be later released with some suitable sequence in time. The space dependence is fundamentally controlled by the projection of the magnetospheric structure over the ionosphere.

K-47512

Van Zele, M.A., Schneider, O., **Geomagnetic perturbations in the southern polar cap**, *Geofísica internacional*, Apr.-June 1992 31(2), p.121-124.

The energy input in the non-diurnal auroral ionosphere from the surrounding of the magnetotail neutral sheet enhances the auroral electrojets, whose variations are reflected by the ground level geomagnetic field within the polar caps. The subject of the present study is to determine the significance of auroral zone geomagnetic indices in polar latitudes. For this purpose, perturbations of the years 1967, '68 and '69 are analyzed. In contrast with the criteria for defining perturbations in other latitudes, variations in the geomagnetic activity indices AE, AL and AU are considered. (Auth.)

K-47513

Cordaro, E.G., Johnson, E.R., Storini, M., **Neutron monitor on King George Island**, *Geofísica internacional*, Jan.-Mar. 1992 31(1), p.79-87, 9 refs.

With the support of the Chilean Antarctic Institute the galactic and the solar cosmic ray radiation will be monitored during the early nineties on King George I. The continuous registrations of a 6-NM-64 detector will be used to investigate solar-terrestrial relationships. The instrument was placed in Jan. 1991 on a hill near the old meteorological center 'E. Frei' and about 400 m from 'Las Estrellas' village (Tte. Marsh Station, Caleta Ardley, Fildes Bay). General features connected with the installation of the monitor and initial measurements are described. (Auth.)

K-47589

Beliazo, V.A., Vovk, V.IA., **Relationship between riometric absorption and meteorological factors** [O sviazi riometricheskogo pogloshcheniia s meteorologicheskimi faktorami], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.35-38, In Russian.

Comparison of surface temperature changes with cosmic noise absorption parameters, and the dependence of wind direction and speed on cosmic noise absorption at 32 MHz, recorded at Molodezhnaya Station in May 1987, are discussed. Analysis of data obtained during summer and winter seasons of 1987 shows that during the winter months the presence of corpuscular fluxes in the auroral zone and the polar cap can significantly affect the accuracy of meteorological-phenomena forecasts.

K-47590

Vovk, V.IA., Khodzha-Akhmedov, Ch.L., **Ionospheric radio channel characteristics based on oblique-incidence soundings** [Issledovaniia kharakteristik ionosfernogo radiokanala po dannym naklonnogo zondirovaniia v Antarktide], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.38-41, In Russian. 8 refs.

Results of studies on radio wave propagation at high latitudes are discussed. The trajectory of radio waves calculated from high latitude ionospheric models under 12-hr radiation, at 3, 8 and 14 MHz, is shown in graphs. Average values of spectral expansion of signals and frequency shifting on polar radio waves in Apr.-Oct. 1987, between Leningradskaya-Molodezhnaya (3990 km), Vostok-Molodezhnaya (2130 km), and Bellingshausen-Molodezhnaya (4370 km), are discussed and presented in a table.

K-47591

Khodzha-Akhmedov, Ch.L., **Synchronization of the operation of oblique-incidence ionospheric sounding stations** [Sinkhronizatsiia raboty stantsii naklonnogo zondirovaniia ionosfery], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'*, 1991 No.115, p.41-44, In Russian.

Computation methods and results showing both signal distribution time and hour correction for antarctic radio communication oblique incidence sounding are discussed and presented in a table.

K-47606

Pomerantz, M.A., **Astronomy at the South Pole**, *Annals of the New York Academy of Sciences*, 1992 Vol.655, Frontiers in cosmic physics: Symposium in memory of Serge Alexander Korff. Edited by R.B. Mendell and A.I. Mincer, p.235-253.

DLC Q11.N5 vol.655

Following a brief opening in which the virtues of the South Pole as a research laboratory are extolled, we are informed of a development over the last ten years in helioseismology in which the sun has been discovered to be a great spherical resonator. This produces a regular pattern of oscillations having a period of about five minutes. By observing these oscillations and determining their frequencies and other details, a way has been devised to investigate the structure and dynamics of the solar interior. There are also harmonics of these oscillations which are produced in about ten million different modes. It is also possible to observe the longest wavelengths. By continuously monitoring the sun as a function of time, the spectrum of the oscillations can be determined. On all of this the author lays a caveat: "These experiments are very difficult. It's like trying to record the New York Philharmonic on the other side of a concrete wall, while a guy is using a jackhammer on the wall and someone is playing with the volume control. From an analysis of the measured frequencies, you then attempt to determine which instruments were being played."

K-47709

Rester, A.C., **GRAD supernova observer: first flight of a very large balloon over Antarctica**, *Advances in space research*, Feb. 1993 13(2), p.(2)87-(2)99, 14 refs.

The first very large, zero pressure balloon to be flown over Antarctica was launched from Williams Field near Ross I. on Jan. 8, 1988. It carried the GRAD Supernova Observer Experiment, with which a study of the gamma-ray spectrum of SN1987a was made. The mission is reviewed, and recommendations for further long duration balloon flights are made. (Auth.)

K-47726

Andreani, P., **Millimeter observations of the Magellanic Clouds**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.1-4, Reprinted from The astrophysical journal, Jan. 10, 1990, 348, p.467-470. 18 refs.

Millimetric observations (1-2 mm) of the Magellanic Clouds from Antarctica show a good spatial correlation with the IRAS 100 micron emission in the same sky regions. Very likely a cold component co-existing with the warm dust detected by IRAS has been observed. (Auth.)

K-47727

Calisse, P., **OASI Observatory in Antarctica**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settori fisica dell'atmosfera e cosmofisica. Raccolta pubblicazioni gennaio 1986-luglio 1991, Vol.2. (Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2), Rome, ENEA, [1991], p.117-118, Reprinted from proceedings of the 29th Liege International Astrophysical Colloquium "From ground-based to space borne sub-mm astronomy", July 3-5, 1990. 7 refs.

OASI is the first large (2.6 m diameter) infrared and sub-mm telescope ever mounted in Antarctica. The telescope is devoted to the study of the Cosmic Background Radiation (CBR) anisotropy at small angular scale (from a few arcmin to 1 degree). OASI is equipped also with a 1.5 m diameter wobbling off-axis paraboloid whose main purpose is to study the intermediate scale CBR anisotropy (from 1 to 10 degrees); and a small portable off-axis wobbling telescope for various other measurements on the Antarctic Tourmaline Plateau at 1600 m altitude. Preliminary results of CBR anisotropy measurements and on the detection of diffuse mm dust emission are discussed. (Auth.)

K-47778

Gillingham, P., ed, **Proposal for an International Antarctic Observatory**, International Astronomical Union. Highlights of astronomy, vol. 9, edited by J. Bergeron, Dordrecht, The Netherlands, Kluwer Academic Publishers, 1992, p.575-601.

DLC QB51.I57 v.9, 1991

This Joint Commission Meeting aimed to increase world-wide awareness of the attractions of Antarctica for a number of important classes of observational astronomy, and to acquaint astronomers with the very significant amount of work already done there and the more ambitious plans now developing. Papers were given under three headings: 'the attractions of Antarctica for astronomy', 'current astronomical programs', and 'plans for the future'. The summaries are presented here in that sequence. The major attractions for astronomy result from the cold, tenuous, and extremely dry atmosphere. A sample of topics broached in the papers includes atmospheric transparency at IR and mm wavelengths; B and V photometry; instrumentation and visibility; cosmic microwave background; and national astronomy plans and activities.

K-47798

Storini, M., Cordaro, E.G., **Antarctic laboratory for cosmic rays (LARC): status report**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.233-249, 20 refs.

An Antarctic Laboratory for Cosmic Rays (LARC) was installed on King George I. (Fildes Bay) in Jan. 1991. The authors describe its 1991 status; examples of the available data are reported. An implementation of the LARC research program is expected in the near future. (Auth.)

K-47800

Meloni, A., **Daily geomagnetic variation analysis with Terra Nova Bay 1990 data**, Italian Research on Antarctic Atmosphere, Conference proceedings. Vol.35, Bologna, Italian Physical Society, 1992, p.267-277, 23 refs.

After the installation of the Terra Nova Bay geomagnetic observatory, started during the ItaliAntartide project in 1986, an automatic wintering-over data acquisition experiment was undertaken for the 1990 austral winter season. Low power geomagnetic element fluxgate and total field proton precession magnetometers and a data acquisition system were installed at the end of the 1989/90 summer expedition. The system was run on rechargeable batteries powered by solar panels; at the beginning of the 1990/91 expedition in Nov., all data were retrieved from the data bank. Results of more than 90% of data coverage were obtained throughout the 1990 solar year, enabling the authors to investigate a full-year geomagnetic field variation. In this paper, data are analyzed focussing mainly on daily variations of the geomagnetic field. Technical details related to the wintering-over experiment are given. Results of the daily variation analysis show that peak amplitudes of the variation are reached in austral summer months for all harmonics. (Auth. mod.)

K-47909

Reznikov, A.E., **Investigations of the lower ionosphere over Antarctica via ELF-VLF radiowaves**, *Antarctic Science*, Mar. 1993 5(1), p.107-113, Refs. p.112-113.

ELF-VLF investigations of the lower antarctic ionosphere are discussed. Two new methods of lower ionospheric diagnostics are based on an investigation of the VLF electromagnetic field structure in the Earth-ionosphere cavity. One method deals with the analysis of local transverse cavity resonances in the near field of an emitter (a horizontal antenna) with a frequency (1.5-8 kHz) in the range of the first few resonances. The other method, based on tweek investigations, is applicable under night conditions and enables the characteristics of the lower ionosphere to be determined over a signal propagation path. The use of the ELF-VLF transmitter at Siple Station provides a unique opportunity to implement these methods, as does the ELF multipoint recording in the Schumann resonance band of atmospheric excited by powerful lightning discharges. (Auth.)

K-47923

Stark, A.A., **Submillimeter astronomy from the Antarctic Plateau**, *European Space Agency. Special publication*, Dec. 1990 ESA SP-314, From ground-based to space-borne sub-mm astronomy: Proceedings of the 29th Liège International Astrophysical Colloquium, July 1990, edited by B.H. Kaldeich, p.307-309, 8 refs.

DLC QB479.4.L54 1990

The Antarctic Plateau is the best submillimeter-wave observatory site on the Earth's surface. The Antarctic Submillimeter Telescope and Remote Observatory (AST/RO), a 1.7 m offset telescope for heterodyne spectroscopy scheduled for installation at the South Pole in 1992, will be a proof-of-concept for a permanent antarctic submillimeter observatory. In future, a 15 m class telescope at an international base on the Antarctic Plateau at 4200 m altitude could be used to observe protogalaxies and protostars. This telescope might be an international collaboration.

K-47934

Hayakawa, M., Shimakura, S., Kobayashi, Y., Sato, N., **Statistical characteristics of the polarization of Pc1 micropulsations at high latitudes**, *Planetary and space science*, Oct. 1992 40(10), p.1353-1362, 24 refs.

The statistical dependence of the occurrence rate of polarization (left-handed, right-handed and linear) of Pc1 micropulsations on local time and wave frequency has been deduced on the basis of the data observed in Iceland and in Antarctica ($L=6$ to about 7) during the whole year of 1985. It is found that left-handed polarized pulsations tend to be most numerous until L.T.=14:00 and at wave frequency of 0.4-0.6 Hz in Iceland, while the corresponding peak occurrence rate of right-handed polarization takes place at later L.T.s and at a frequency of 0.2-0.4 Hz in Iceland. The joint consideration of these statistical characteristics with the previous classification of Pc1 micropulsa-

tions enables one to study the mechanism of generation and propagation of different types of Pc1 pulsations. Simultaneity and conjugacy of polarization at different stations are discussed. (Auth.)

K-47935

McKnight, J.D., **Evaluation for the New Zealand region and Antarctica of candidate models for the IGRF series**, *Journal of geomagnetism and geoelectricity*, 1992 44(9), p.863-870, 1 ref.

Five sets of candidate models for DGRF1985 and IGRF1990 (main field), three of which also contain candidate models for IGRF1990 (secular variation), were compared with a regional field model at a grid of points over the New Zealand region. The results show that GSFC1985DS is the best of the candidate models for DGRF1985 and that USGS90S is the best of the candidate models for IGRF1990 (secular variation). It is not possible to pick the best candidate model for IGRF1990 (main field). A test of the candidate models for IGRF1990 using antarctic data reveals larger differences between predicted and observed field strength components than occur for New Zealand, and overall a good agreement between predicted and observed secular variation. (Auth.)

K-47936

Sibeck, D.G., **Transient magnetic field signatures at high latitudes**, *Journal of geophysical research*, Jan. 1, 1993 98(A1), p.243-256, 56 refs.

A survey is made of GOES 2/5/6 geosynchronous and Huancayo, Peru, ground magnetometer observations at the times of 70 transient (2-10 min) events recorded at South Pole Station. The simultaneous observations indicate that most South Pole events correspond to sudden sharp variations in the equatorial magnetospheric and low-latitude ground magnetic field. The exceptions occur when the South Pole events have weak amplitudes and/or Huancayo and GOES 2/5/6 are far from local noon. The corresponding features observed at GOES 5 and GOES 6 are generally similar, with a lag indicating antisunward motion. A similar antisunward motion may be inferred from the ground observations themselves. On a case-by-case and statistical basis, the characteristics of the events observed in South Pole ground magnetograms resemble those previously interpreted as sudden impulse and sudden storm commencement signatures at other high-latitude stations. These observations suggest that the transient events at South Pole form part of the magnetospheric and ionospheric response to a sudden change in the fraction of the solar wind dynamic pressure applied to the magnetosphere. (Auth.)

K-48097

Stephenson, J.A.E., Scourfield, M.W.J., **Ozone depletion over the polar caps caused by solar protons**, *Geophysical research letters*, Dec. 24, 1992 12(24), p.2425-2428, 11 refs.

Energetic solar protons are a natural source of ozone depletion due to the nitric oxides they produce in the earth's atmosphere. In Mar. 1989, following a period of intense solar activity, the TOMS instrument aboard the Nimbus 7 satellite recorded very similar ozone losses over both polar caps for areas extending from 90 to 70 degs. Ozone depletions of 7.4 G kg for the south polar cap and 8.0 G kg for the north polar cap indicate the degree of symmetry over the polar caps. (Auth.)

K-48291

Thuillier, G., **Auroras [Les aurores]**, *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, Aug. 1991 No.25, p.15-21, In French with English summary. 17 refs.

A description is given of auroral phenomena in general, and on Adélie Coast in particular; the interpretation of those phenomena through history is reviewed.

K-48430

Bensadoun, M.J., **Measurements of the cosmic microwave background temperature at 1.47 GHz**, Berkeley, University of California, 1991, 135p., DE93 000587, Ph.D. thesis. Refs. p.90-92.

A radiofrequency-gain total power radiometer measured the intensity of the cosmic microwave background (CMB) at a frequency of 1.47 GHz (20.4 cm wavelength) from White Mountain, CA, in Sep. 1988 and from the South Pole in Dec. 1989. The CMB thermodynamic temperature, TCMB, is 2.27 ± 0.25 K (68% C.L.) measured from White Mountain and 2.26 ± 0.21 K from the South Pole site. The combined result is 2.27 ± 0.19 K. The correction for galactic emission has been derived from scaled low-frequency maps, and is the main source of error. The atmospheric signal is found by extrapolation from zenith scan measurements at higher frequencies. The result is consistent with previous low-frequency measurements, including a measurement at 1.41 GHz made with an earlier version of this instrument. The result is about 2.5 sigma (about 1% probability) from the 2.74 ± 0.02 K global average CMB temperature. (Auth.)

K-48451

Mielke, T.A., Helliwell, R.A., **Siple Station, Antarctica, experiments on staircase frequency ramps as approximations to continuous ramps**, *Journal of geophysical research*, Mar. 1, 1993 98(A3), p.4053-4061, 16 refs.

VLF wave growth and emission triggering in the magnetosphere are known to depend on the coherence of the input signal. In these experiments the input signal may take the form of a constant frequency pulse (1 s duration) or a linearly chirped pulse (also 1 s duration) with a frequency ramp (1000 Hz/s) of either positive or negative slope. When a frequency ramp of 1000 Hz/s is approximated by a contiguous sequence or short, constant frequency steps, the growth behavior is unchanged for step durations less than 25 ms. For a step duration of 25 ms, the behavior more nearly resembles that of a pure ramp, but some evidence of individual step growth can be seen. For step durations of 50 ms and 100 ms, growth is relatively small and is confined to each individual step, with little coupling between steps. Rising ramps generally show more growth than falling ramps of similar step size and average slope, confirming earlier observations. An equivalent "sawtooth" frequency variation with an average slope of zero and a step size of 25 ms behaves much like a constant frequency pulse. (Auth. mod.)

K-48452

Piccirillo, L., Calabresi, M., Zucchetti, M., **Differential radiometer for mm wavelengths**, IEEE MTT-S International Microwave Symposium, Albuquerque, NM, June 1-5, 1992. Vol.3, Piscataway, NJ, The Institute of Electrical and Electronics Engineers, Inc., 1992, p.1379-1382, 2 refs.

The performance of an antenna system operating at mm wavelengths is discussed. Results from several measurements under different test conditions are presented. The antenna was used to make observations from Antarctica of the diffuse sky emission at 94 GHz. (Auth.)

K-48512

Ono, T., **Upper atmosphere physics data, Syowa and Asuka Stations, 1990**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.186, 222p., 12 refs.

The report summarizes upper atmosphere physics data acquired by the Upper Atmosphere Physics Monitoring System at Showa and Asuka Stations in 1990. The items of observations at both stations are as follows: geomagnetism; ionosphere (cosmic noise absorption at

30 MHz); and aurora. ELF-VLF waves were observed at Showa Station only. The systems were installed at Showa Station in Jan. 1981, and at Asuka in Jan. 1987. Block diagrams of the systems, specifications of the observation instruments, the recording periods, and the format of the compiled digital data are included. Continuous computer plots of magnetograms for Jan. 1-Dec. 31, 1990 at both stations are given in the Appendix.

K-48513

Nozaki, K., Igarashi, K., **Records of radio aurora at Syowa Station, Antarctica in 1991**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.188, 25p., 1 ref.

A summary of data obtained with the auroral radar at Showa Station during 1991 is presented. The available data include chart records of the time variation of echo intensity, digital MT, and 35 mm film records of radio auroral echo intensity (A-scope) and range-time intensity (A'-scope). A brief explanation of diagrams and a bibliography relevant to riometer records of 30 MHz cosmic noise at Showa Station between 1967 and 1990 are also presented.

K-48514

Nozaki, K., Kunitake, M., **Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1991**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.189, 184p.

At Showa Station, absorption of cosmic radio noise has been observed with a standard riometer (relative ionospheric opacity meter) at 30 MHz, since Feb. 1966. This report presents data observed from Jan. 1 to Dec. 31, 1991, in the format of hourly values and combined data plots. Other observation data are presented for reference. These data include geomagnetic field, HF, VLF and radar observations. A bibliography relevant to records of radio aurora at Showa Station between 1966 and 1990 is included.

K-48515

Ichinose, M., Nozaki, K., Kainuma, S., **HF field strength data measured at Syowa Station, Antarctica from Jan. to Dec., 1991**, *Japanese Antarctic Research Expedition. JARE data reports*, Mar. 1993 No.191, 17p., 1 ref.

The report summarizes the results of field strength measurements of 8 MHz JJY (standard frequency waves) for Jan.-Dec. 1991. Additional information, with tabulated data, is provided on observers, particulars of the transmitter and receiver, derivation of the skywave field strength, monthly tabulation sheets, and diurnal variations of the field strength.

K-48516

Yamagishi, H., ed, **NIPR Symposium on Upper Atmosphere Physics**, 15th, Tokyo, Jan. 28-29, 1992, **Proceedings of the NIPR Symposium on Upper Atmosphere Physics, No.6**, Tokyo, National Institute of Polar Research, 1993, 138p., Refs. passim. For selected papers see K-48517 through K-48522.

This volume contains 12 selected scientific papers among 63 individual contributions presented at the 15th Symposium on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions, held at the National Institute of Polar Research on Jan. 28-29, 1992. Five full-length papers and 1 extended abstract are pertinent to Antarctica and deal with the following: geomagnetic field observations, solar wind/magnetosphere/ionosphere coupling, radio auroral activity, and results with an imaging riometer.

K-48517

Tohyama, F., Fujii, R., Ejiri, M., Yajima, N., **Observations of the geomagnetic field by Polar Patrol Balloon (PPB) experiment in Antarctica**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.15-24, 11 refs.

Two scientific balloon experiments of the Polar Patrol Balloon (PPB) project were performed by JARE-32 in Dec. 1990 and in Jan. 1991. Proton precession magnetometers were used to measure the total intensity of the geomagnetic field for studying the underground magnetic structure by detecting magnetic anomalies and geomagnetic variations like pulsations. The first balloon (PPB-1) showed a trajectory through the center of the Magnetic South Pole with a circumpolar trajectory. The total intensity of the geomagnetic field was obtained by the ARGOS data transmission system every 30 s with an accuracy of 1 nT during the flight of 22 days. A new proton precession magnetometer system was developed that had a wide dynamical measurement range for the PPB observation. This brief paper reports magnetometry, data processing system and some preliminary results. (Auth.)

K-48518

Dudeney, J.R., **Signatures of dayside solar wind/magnetosphere/ionosphere coupling as revealed by the PACE HF radars and associated experiments**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.25-35, Refs. p.34-35.

The nature of the coupling between the solar wind and magnetosphere on the dayside of the Earth, and the response of the ionosphere to this coupling are currently topics of considerable interest and debate. This paper summarizes recent studies of some ionospheric signatures of such coupling processes for a range of spatial and temporal scales, utilizing the unique combination of the two PACE HF radars (at conjugate locations in the Arctic and Antarctic), the IMP-8 and DMSP-F9 spacecraft, and ground-based experiments at South Pole. (Auth.)

K-48519

Ohtaka, K., Tanaka, T., **Long term variations of radio auroral activity**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.36-41, 7 refs.

Long term variations of radio auroral activity are investigated from auroral radar data obtained at Showa Station during 1978-1990. The diurnal variation of radio auroral activity shows a maximum in the post-midnight period with a small peak in the evening. Similar to the case of magnetic activity, the occurrence rate of radio aurora shows semi-annual variations with summer (Dec.) and winter (June) time minimums. For post-midnight radio aurora, summer minimums are more pronounced than winter minimums. The magnetic activity controls the occurrence of evening time radio aurora more notably than post-midnight radio aurora. For the solar cycle variation, a double-peaked modulation is seen during 11-year sunspot cycle, with a major peak in the declining phase of the sunspot cycle and a secondary peak in the increasing phase. (Auth.)

K-48520

Kunitake, M., **New-type echoes observed with the 50 MHz auroral Doppler radar at Syowa Station (extended abstract)**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.42-46, 6 refs.

A new type of auroral echoes has been detected by the Showa Station 50 MHz auroral Doppler radar. Preliminary statistical ana-

lyses indicate that these echoes (almost appearing at nearest radar ranges) have narrow spectral peaks located at the frequencies less than ± 20 Hz and frequently occur in the morning with the durations of a few tens of seconds to a few tens of minutes. The diurnal occurrence rate is very different from that of usual radar echoes. The new-type echoes do not seem to belong to the echo types (type 1-4) that have been found until now.

K-48521

Nishino, M., **Initial observation results with imaging riometer at Ny-Alesund (L=16)**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.47-61, 23 refs.

An imaging riometer was installed at Ny-Alesund for observations of spatial structure and motion of auroral absorption regions. The antenna consists of a two-dimensional dipole array with 64 elements, and a phasing matrix produces 64 pencil beams viewing an ionospheric area of about 200 sq km at 90 km altitude. The instrument provides a two-dimensional image of enhanced absorption at 30 MHz with spatial resolution of 20 km and time resolution of 1 s by using an 8-channel radio receiver. With the aid of a personal computer, absorption images can be monitored in real time by using a quiet day curve produced from daily variations of cosmic radio noise intensity during the initial ten days. Three examples of the absorption images are presented for the events occurring during the day, evening and night time and are compared with those observed at Amundsen-Scott Station and Sondre Stromfjord, which are located at nearly the same invariant latitude. (Auth. mod.)

K-48522

Yamamoto, T., Ozaki, M., **Theory of current generator in the magnetosphere-ionosphere coupling**, NIPR Symposium on Upper Atmosphere Physics, Proceedings. No.6, Tokyo, National Institute of Polar Research, 1993, p.62-69, 10 refs.

A theoretical model for generation of a pair of region 1 and region 2 field-aligned currents (FACs) is presented. From the observed pattern of auroras, the existence of a hot plasma torus (HPT) in the magnetosphere can be assumed. An HPT is defined as a hot plasma contained in the magnetic shell which is connected to two ovals of diffuse auroras in the northern and southern polar ionospheres. It is proposed that region 1 and region 2 FACs can be generated as a result of natural distortion of the HPT under the influence of the solar wind convection. (Auth.)

K-48526

Paquette, J.A., **Long period pulsation events in electron precipitation and magnetic fields at the South Pole**, College Park, University of Maryland, 1992, 144p., University Microfilms order No. AAD92-34636, Ph.D. thesis. Refs. p.140-144.

Geomagnetic pulsation events with long (100-1000 second) periods that are accompanied by electron precipitation pulsations at the same frequency have been reported at various latitudes. A search of the data from Amundson-Scott Station for the period from 1982 to 1989 revealed over 200 such events. A comparison of these events with the predictions of Coroniti and Kennel (1970) was undertaken. A consideration of the respective wave and particle transit times from the magnetic equator to the ground leads to an expectation that the onset of pulsations in the magnetometer data will lag the onset of pulsations in the riometer data by several minutes. This disparity in onset times, together with VLF modulation in the proper frequency range, serve as important indicators of whether or not an event can be explained by the above-cited theory. While about a third of the events fit the prediction of Coroniti and Kennel, another third cannot

be explained by this theory, and possible alternative mechanisms are explored. The remaining third of the events appear at first to be inexplicable in terms of any transit time argument, but analysis of the IRIS data shows that this third class of events arises from differences in the spatial coverage of the instruments. (Auth. mod.)

K-48545

Ohnami, S., Hayakawa, M., Bell, T.F., Ondoh, T., **Nonlinear wave-wave interactions in the subauroral ionosphere on the basis of the ISIS-2 satellite observations of Siple Station VLF signals**, *Geophysical research letters*, Apr. 23, 1993 20(8), p.739-742, 19 refs.

Nonlinear wave-wave interaction between signals from a ground-based VLF transmitter and narrow-band ELF emissions in the subauroral antarctic ionosphere is studied by means of bispectrum and bicoherence analysis. A bicoherence analysis has indicated that the sideband structures around the Siple transmitter signal received by the ISIS satellite are due to nonlinear interaction between the Siple VLF signal and the pre-existing ELF emission. (Auth.)

K-48616

Hashimoto, K., Sato, N., Kusunose, M., **Statistical study on the conjugacy of geomagnetic field variations**, *Antarctic record*, Mar. 1993 37(1), p.1-18, In Japanese. 8 refs.

The diurnal and seasonal dependence of the conjugacy of geomagnetic variations associated with the auroral electrojet is investigated and their dependence on ionospheric conductivity (due to solar EUV and auroral particle precipitations) is examined. The authors analyze the fluxgate magnetometer data from two magnetic conjugate stations at Showa in Antarctica and at Aedey in Iceland, from Sep. 1989 to Sep. 1990, and examine the ratio of the magnitudes of the geomagnetic variations between the two stations. The magnitude of geomagnetic variation showed dependence on the geomagnetic activity level. Generally, in all seasons, the magnitude at Showa appears to be larger than that at Aedey for both positive and negative variations in geomagnetic activity level. These results are consistent with the diurnal and seasonal changes of the ionosphere, depending on the sunlight conditions. The effects of ionization from auroral particle precipitations are discussed. (Auth. mod.)

K-48758

Besprozvannaia, A.S., **Spatial-temporal distribution of ionization of the F2 layer at high latitudes of the northern and southern hemispheres during wintertime**, *Geomagnetism and aeronomy*, Dec. 1992 32(3), p.319-326, 22 refs.

The results of a comparison of the winter F2 layer at high latitudes of the Northern and Southern Hemispheres on the basis of an empirical model of the distribution of NmF2 are given. A comparison is made of the calculated maps of the distribution of NmF2 for the Dec. (N) and June (S) solstices for four fixed UT times: 00 h, 06 h, 12 h, and 18 h at Kp=3. It is shown that under equal heliophysical conditions, the electron density at the altitudes of the maximum of the F2 layer can differ in both hemispheres by a factor of 2-5. The degree of difference depends on the UT time. The suggestion is advanced that the observed asymmetry of ionization of the F2 layer at high latitudes for fixed UT times is produced mainly by two causes: one is related to the noncoincidence of the geomagnetic and geographic poles (the UT effect), and the other to the variation of the slope of the dipole axis relative to the sun for the Dec. and June solstices (the annual anomaly). The UT effect is intensified as a result of the annual anomaly on the daytime side for 18 h UT, and on the nighttime side for 06 h UT. (Auth.)

K-48759

Shchepkin, L.A., Kushnarenko, G.P., **Peculiarities of the spatial distribution of some characteristics of the thermosphere and ionosphere above Antarctica**, *Geomagnetism and aeronomy*, Dec. 1992 32(3), p.341-344, 11 refs.

Good agreement is shown between the statistical mean pattern of the spatial distribution of diurnal variations in the thermosphere's parameters, described by the MSIS-86 model of it, and the behavior of the ionosphere. This is based on a comparison of model calculations of development of the ionosphere's F1 layer and observational data of the frequency of appearance of a distinctly expressed layer in the Antarctic. (Auth.)

K-48775

Jefferies, S.M., Pomerantz, M.A., Harvey, J.W., Duvall, T.L., Jr., **Helioseismology from South Pole: 1990 high-resolution campaign**, *Antarctic journal of the United States*, 1991 26(5), p.285-286, 8 refs.

Solar images recorded once per minute from Nov. 9, 1990 to Jan. 13, 1991 showed the Sun's brightness in a 1-nanometer bandpass centered on the 393-nanometer calcium-II spectral line. Analysis of the more than 100 gigabytes of recorded data shows that a satisfactory temporal frequency response function was obtained. The telescope used was capable of making high-resolution images and, for the first time, observations were limited by atmospheric turbulence rather than by the instrument. Image sharpness proved to be variable and seldom better than a few arc seconds. A comparison of image quality with regular balloonsonde measurements is in progress. The image quality was such that oscillations of spherical harmonic degree up to about 1,000 were detected.

K-48776

Smoot, G.F., **Long-wavelength spectrum of the cosmic microwave background**, *Antarctic journal of the United States*, 1991 26(5), p.286-288, 7 refs.

In the austral summer of 1989, the authors took 6 radiometers and the cold-reference target to a site about 1.6 km from Amundsen-Scott Station. During the 4-week observational campaign, they conducted extensive measurements of the atmospheric emission at 0.3, 4, 8, 12, and 37 cm, and of the galactic emission profile and cosmic background radiation temperature at 4, 8, 12, 20, and 37 cm. Results of the observations are in press or in progress.

K-48777

Smith, R.W., Hernandez, G., Price, K.L., **Observations of winds and temperatures at Amundsen-Scott Station using the oxygen 0-1 atmospheric band**, *Antarctic journal of the United States*, 1991 26(5), p.288-291, 4 refs.

The first optical determination of temperatures and winds derived from high-resolution measurements of oxygen atmospheric bands in the austral polar upper atmosphere is presented here. The temperatures obtained appear to indicate contamination of the photochemically produced layer emission of the atmospheric bands by auroral excitation. These variations are simultaneously observed with atomic oxygen emission at 5577 angstroms, which is used as an indicator of auroral activity. These measurements illustrate the capabilities of this method to obtain upper atmospheric kinetic temperatures and winds from molecular species.

K-48778

Byrne, G.J., Bering, E.A., III, Few, A.A., Morris, G.A., **Measurements of atmospheric conduction currents and electric fields at the South Pole**, *Antarctic journal of the United States*, 1991 26(5), p.291-294, 5 refs.

The authors have constructed instruments to measure the atmospheric conduction current and the atmospheric electric field, two fundamental parameters of the global-electric circuit. The instruments were deployed at Amundsen-Scott Station in Jan. 1991 and are designed to operate continuously for up to 1 year without operator intervention.

K-48779

Bering, E.A., III, Byrne, G.J., Few, A.A., Morris, G.A., **Initial results from measurements of atmospheric conduction currents and electric fields at the South Pole**, *Antarctic journal of the United States*, 1991 26(5), p.294-296, 6 refs.

The authors have found that atmospheric electricity instruments 600 m apart near Amundsen-Scott Station were measuring signals of global origin, except when it was snowing, detecting variations of 1-2% amplitude. The instruments can detect signals of global origin on time scales of a few minutes.

K-48780

Paquette, J.A., Matthews, D.L., **Comparison of low-frequency pulsations in electron precipitation and magnetic fields at South Pole Station**, *Antarctic journal of the United States*, 1991 26(5), p.297-298, 4 refs.

The University of Maryland 30-megahertz riometer and the Bell Labs fluxgate magnetometer have recorded data continuously at Amundsen-Scott Station since 1982. The riometer provides a measurement of the flux of energetic (greater than 5-10 keV) electrons precipitating into the ionosphere, while the magnetometer detects the components of the geomagnetic field in the H (north-south), D (east-west), and Z (vertical) directions. A survey of the data from these two instruments reveals the existence of intervals of long-period (200-1,000 seconds) pulsations appearing in both precipitation and fields. Only those events showing three or more complete cycles and occurring between 0600 and 1800 hrs magnetic local time were considered; this produced a database of 252 events for the period from 1982 to 1989.

K-48781

Wang, Z., Detrick, D.L., Rosenberg, T.J., **Imaging riometer measurements of F-region electron density structures**, *Antarctic journal of the United States*, 1991 26(5), p.298-301, 4 refs.

While studying South Pole riometer and auroral photometer data for signatures of the dayside polar cusp, a localized region of the magnetosphere where the entry of magnetosheath plasma to low altitudes is most direct, several unusual events were encountered. Significant riometer absorption can occur in the cusp and polar cap in the apparent absence of electron precipitation with energies sufficient to cause D-region ionization enhancements. Some of the anomalous absorption events may be due to F-region electron density patches formed in the cusp and drifting into the polar cap. Detailed information about F-region patches, such as electron density and temperature profiles, will be used to make a comparison of calculated F-region absorption values with those actually measured.

K-48782

Popecki, M.A., Arnoldy, R.L., Engebretson, M.J., Cahill, L.J., **Identification of a post-magnetic-noon source for Pc1-2 micropulsations**, *Antarctic journal of the United States*, 1991 26(5), p.301-302, 5 refs.

Inductions coils were operated at Sondre Stromfjord, Greenland, Siple and South Pole during 1986. The data for the entire year was Fourier transformed and presented in spectrograms covering the 0.1-5.0 hertz range. Events with well-defined spectral peaks (Pc-type

micropulsations) were selected, and information about them was gathered into a database. The center frequency, bandwidth, start and stop times, and other information were recorded for some 4,500 events from all three stations. The three stations display a diurnal pattern, with a postmagnetic noon peak. The presence of this pattern at South Pole eliminates the explanation of sunlight-induced propagation effects, since South Pole has no solar day.

K-48783

Engebretson, M.J., **Comparison of ultra-low-frequency fluctuations in magnetic field and very-low-frequency emissions at three antarctic stations**, *Antarctic journal of the United States*, 1991 26(5), p.302-304, 2 refs.

As a follow-up study, the authors have looked at the relationship between quasi-periodic emissions and magnetic pulsations and their spatial extent by using data obtained during Sep. 1986 from 3 sites in Antarctica: Halley Bay and Siple stations lie close to the nominal position of the plasmapause (deep in the magnetosphere), and Amundsen-Scott Station is near the dayside cusp, but at nearly the same longitude, relative to the Earth's magnetic field, as Halley Bay. Data suggest that compressional ultra-low-frequency pulsations, responsible for the modulation of very-low-frequency signals, do not penetrate far inward from the dayside magnetopause. This in turn raises questions about how Pc 3-4 magnetic pulsations can reach to lower latitudes, because it has been assumed that compressional ultra-low-frequency pulsations were the means of transport. An alternative possibility is that the generation of quasi-periodic emissions via an ultra-low-frequency modulation effect might be greatest where the total magnetic field is the weakest, and thus might be limited to regions in the outer magnetosphere.

K-48784

Bieber, J.W., Chen, J.S., **Three-dimensional perspective on cosmic-ray anisotropies**, *Antarctic journal of the United States*, 1991 26(5), p.305-306, 8 refs.

Long-term measurements of the flow of cosmic rays near Earth provide a vital observational basis for testing theories of the transport and solar modulation of galactic cosmic rays. These flows are manifested as small (typically less than 1%) anisotropies in the flux of cosmic rays recorded by ground-based detectors. The two components of the anisotropy in the ecliptic plane are collectively called the "diurnal anisotropy," because they are determined through analysis of the diurnal variation recorded by a low-latitude or midlatitude detector. The third component of anisotropy represents flows normal to the ecliptic plane, and is called the "north-south" anisotropy. It can be accurately measured by comparing fluxes recorded at neutron monitor stations operated by the Bartol Research Institute in McMurdo and Thule, Greenland.

K-48785

Wilkes, R.J., **Long-duration antarctic balloon flight using emulsion chamber cosmic-ray detectors**, *Antarctic journal of the United States*, 1991 26(5), p.306-309, 4 refs.

JACEE (Japanese-American cosmic ray emulsion chamber experiment) is a U.S.-Japanese collaboration that has performed a series of long-duration balloon flight experiments over the past 10 years. The purpose of the experiment is to study the spectra, composition, and interactions of primary cosmic rays at energies greater than 1 TeV per nucleon. A secondary motivation for the 1990 antarctic flight was to evaluate the performance of JACEE emulsion chamber detectors in the presence of high background dose rates, to some extent emulating conditions that might be encountered in space flight exposures and/or future long-duration balloon flight campaigns.

K-48786

Burgess, W.C., Inan, U.S., **Ducted whistlers and the burst loss of radiation-belt electrons to geomagnetically conjugate ionospheric regions**, *Antarctic journal of the United States*, 1991 26(5), p.309-311, 6 refs.

Lightning-associated bursts of high-energy electrons appear to precipitate from the radiation belts primarily or exclusively because of scattering in the magnetosphere by certain lightning-generated magnetospheric radio waves known as ducted whistlers. If true, this hypothesis could help explain how thunderstorms contribute to the dynamic equilibrium of the radiation belts. The authors present here a portion of the evidence that supports this hypothesis. Precipitating bursts of radiation-belt electrons are studied by examining their effects on radio signals received at Palmer Station and at sites in the Northern Hemisphere.

K-48862

Midya, S.K., Midya, D., **Effect of antarctic O3 decline on night airglow intensity of Na5893Å, O5577Å, OH emissions and its correlation with total solar flare numbers**, *Earth, moon, and planets*, May 1993 61(2), p.175-182, 14 refs.

This paper presents the effect of O3 depletion on different night airglow emission lines. Calculations based on chemical kinetics show that the airglow intensity of Na5893Å, O5577Å and OH band emissions will also be affected due to the depletion of O3 concentration. Intensity of Na5893Å is calculated theoretically for Halley Bay during the period 1973 to 1984. It is concluded from the covariation of different emission lines that O5577Å and OH emissions also follow the same trend of variation. A study has been made to find the correlation between the depletion of O3 and total solar flare numbers. Results show that while depletion of O3 is oscillatory up to 7932 solar flare numbers, the average trend of variation of O3 concentration is downward, i.e., O3 is depleted with the increase of total solar flare numbers; afterwards, it follows an upward trend. A possible explanation for such variation is also presented. (Auth. mod.)

K-48887

Stoker, P.H., **Magnetospheric electrons precipitating into the atmosphere**, *South African journal of antarctic research*, 1991 21(2), p.107, 4 refs.

A short description is given of the process resulting in the aurora phenomenon. The riometer used and the analysis of its observations are discussed, as well as the South Atlantic Radiation Anomaly.

K-48897

Stoker, P.H., **Exploring geospace and the heliosphere by cosmic rays**, *South African journal of antarctic research*, 1991 21(2), p.158, 7 refs.

The first prototype of a neutron moderated detector (NMD) was put onto operation at SANAE Station in May 1972, in time to record, together with the standard super neutron monitor at SANAE, the solar flare proton event of Sep. 1-2, 1971. This prototype detector was replaced by the so-called 4NMD during takeover in Jan. 1974. Important contributions have since been made in recording solar flare proton events by these two detectors with different sensitivities to primary cosmic ray energies.

K-48903

Hughes, A.R.W., Friedel, R.H.W., **OMSKI for SANAE**, *South African journal of antarctic research*, 1991 21(2), p.184, 3 refs.

An OMSKI (Omega and MSK instrument) receives and records the phase and amplitude of four transmitter signals simultaneously. An OMSKI will be installed at SANAE Station in 1993 to record VLF radio signals transmitted from NAA and NSS on the east coast of the

United States and from Liberia and Argentina. The same transmissions will be recorded simultaneously at Halley Bay Station, using an identical receiver. The signal paths to Halley and SANAE are shown in a figure.

K-48904

Rash, J.P.S., **SHARE—An HF radar system for SANAE**, *South African journal of antarctic research*, 1991 21(2), p.185-186, 6 refs.

Planning is currently under way for the installation of an HF radar system at SANAE Station to probe a large area of the ionosphere over Antarctica. Funding for the proposed system will be provided jointly by three institutions in South Africa, the UK and USA. The SANAE and Halley radars will together be known as SHARE—the Southern Hemisphere Auroral Radar Experiment. The fields of view of the two radars over Antarctica are shown in a figure. Also shown is the conjugate area (i.e. mapped along the geomagnetic field lines from the Northern Hemisphere) of the Goose Bay radar in Canada. HF radars have proved to be important instruments for investigating the high latitude ionosphere and magnetosphere.

K-48905

Hughes, A.R.W., Scourfield, M.W.J., **SANAE: the Durban connection**, *South African journal of antarctic research*, 1991 21(2), p.187-192, Refs. p.191-192.

This paper gives an overview of past and present antarctic research carried out by members of the University of Natal, Space Physics Research Institute, at SANAE Station. The results have appeared in over a hundred scientific articles in international journals. The research described has been selected to show the scope of the work done by the group. (Auth.)

K-48996

Clilverd, M.A., Smith, A.J., Thomson, N.R., **Effects of ionospheric horizontal electron density gradients on whistler mode signals**, *Journal of atmospheric and terrestrial physics*, July Aug. 1992 54(7/8), p.1061-1074, 13 refs.

Whistler mode group delays observed at Faraday Station and Dunedin, New Zealand show sudden increases of the order of hundreds of milliseconds within 15 minutes. These events ("discontinuities") are observed during sunrise or sunset at the duct entry regions, close to the receiver's conjugate point. The sudden increase in group delay can be explained as a tilting of the up-going wave towards the sun by horizontal electron density gradients associated with the passage of the dawn/dusk terminator. The waves become trapped into higher L-shell ducts. The majority of the events are seen during June-Aug. and can be understood in terms of the orientation of the terminator with respect to the field aligned ducts. The position of the source VLF transmitter relative to the duct entry region is found to be important in determining the contribution of ionospheric electron density gradients to the L-shell distribution of the whistler mode signals. (Auth.)

K-48997

Clilverd, M.A., Thomson, N.R., Smith, A.J., **Observation of two preferred paths for whistler mode VLF signals received at a non-conjugate location**, *Journal of atmospheric and terrestrial physics*, July/Aug. 1992 54(7/8), p.1075-1079, 13 refs.

Whistler mode signals from NLK (24.8 kHz) were received at Dunedin, New Zealand during 1989-90. The arrival bearing of the signals show a bimodal distribution which is consistent with the results of a 1966 study which suggested the existence of two paths with less total transmission loss than other paths. Path 1 signals, which have a duct entry region just south of Dunedin's conjugate, are observed at

all times of the year, while Path 2 signals, which have a duct entry just south of the NLK transmitter, show an annual variation in occurrence, with a maximum in May and a minimum in Nov. This may be a consequence of horizontal ionospheric electron density gradients near the duct entry region. Similarly preferred paths have been observed at Faraday Station from the NSS transmitter. (Auth. mod.)

K-49264

Steel, D., Ferguson, R., **Auroral observations in the Antarctic at the time of the Tunguska event, 1908 June 30**, *Australian journal of astronomy*, Mar. 1993 5(1), p.1-10, 60 refs.

The original notebooks of Sir Douglas Mawson containing observations of the aurora australis by members of the British Antarctic Expedition at the time of the Tunguska explosion over Siberia on June 30, 1908, have been inspected. It is found that, contrary to some suggestions which note that geomagnetic transients were witnessed elsewhere, and that the BAE was in winter quarters close to the south magnetic pole at the time, no exceptional auroral activity was seen which might have provided useful information on a planet-wide disturbance at the time of the event. However, an exceptional aurora was seen about 7 hours prior to the explosion; it is suggested that this may have been due to an anti-solar comet-like ion tail producing that auroral display whilst the impactor was still far from Earth. (Auth.)

K-49308

Sanides, S., **El Dorado for astronomers** [El Dorado für Astronomen], *Bild der Wissenschaft*, Mar. 1993 No.3, p.34-37, In German.

At the South Pole the night lasts a half year. The air above the Antarctic is so transparent that astronomers here have the best of views to unravel the dark mysteries of the universe. The advantages of such a place for viewing the heavens are described, some of the equipment used is shown, and scientists who operate and maintain the equipment are briefly interviewed as to what has been accomplished thus far and what are prospects for the future.

K-49316

Balsley, B.B., **Southern-Hemisphere PMSE: where are they**, *Geophysical research letters*, Sep. 15, 1993 20(18), p.1983-1985, 5 refs.

Reported here is a surprising absence of PMSE (Polar Mesospheric Summer Echoes) in VHF radar observations of the southern summer high-latitude mesosphere. Observations cover about twenty days during Jan.-Feb. 1993, from King George I. (Auth.)

K-49317

Cummings, J.R., **New evidence for geomagnetically trapped anomalous cosmic rays**, *Geophysical research letters*, Sep. 15, 1993 20(18), p.2003-2006, 22 refs.

Reported here are new observations of 15 MeV/nuc trapped heavy ions with $Z=2$ or more, made on the polar-orbiting SAMPEX spacecraft in late 1992 and early 1993. A trapped population that includes He, N, O, and Ne is located at $L=2$. It is concluded that the observed N, O, and Ne ions are "anomalous" cosmic rays, trapped by the mechanism proposed by Blake and Friesen. While it is not expected that this mechanism would also trap anomalous He, the characteristics of the trapped He population are generally consistent with those of N, O, and Ne. Figures show data distribution into the subantarctic and antarctic areas. (Auth. mod.)

K-49384

Ogura, K., Kodama, M., **Ghost images of auroral X ray sources observed by directional balloon-borne detectors**, *Journal of geophysical research*, Feb. 1, 1989 94(2), p.1508-1514, 17 refs.

Diffusion characteristics of auroral X rays propagating through the south polar atmosphere have been investigated by means of a Monte Carlo simulation. The results are used to estimate the defocusing effect of multiple photon scatterings on auroral X ray images detected at balloon altitudes. It is predicted that the auroral X ray image at an atmospheric depth of 6-14 g/cm² is occasionally accompanied by a spurious ghost image in the zenith when an auroral X ray source near the zenith is viewed by a collimated detector inclined with respect to the zenith. The ghost image is enhanced with increasing zenith angle of the collimator axis. The maximum spurious contribution occurs for a collimator with 20 deg opening angle and 40 deg zenith angle. The magnitude of the spurious contribution also depends on the atmospheric depth and the threshold energy of the detector. (Auth.)

K-49386

Ono, T., **Derivation of energy parameters of precipitating auroral electrons by using the intensity ratios of auroral emissions**, *Journal of geomagnetism and geoelectricity*, 1993 45(6), p.455-472, 29 refs.

A high speed multi-channel photometer was operated at Showa Station in 1990 to derive the energy spectrum of precipitating electrons through an intensity comparison of auroral emission lines and bands. The main purpose of this paper is to describe the instrumentation, the method of data analysis and preliminary results obtained by using the multi-channel photometer. An intense precipitation of very low energy (about 100 eV) electrons was observed in association with a red aurora (called type-A red aurora) during a magnetic storm. Switching signatures of the average energy as well as the total energy flux were observed for intense auroral pulsations. An auroral pulsation, observed for the 630.0 nm (OI) emission line, was associated with a noticeable fluctuation in the average energy of precipitating electrons. During the auroral break-up stage, individual intense arcs are associated with a significant increase of the precipitating electrons' average energy. The auroral lines of short wavelength (such as the 427.8 nm band used in the present observation) suffer from a scattering by the atmosphere, but the author overcame this difficulty by measuring also the 670.5 nm (N₂ 1PG) auroral band emission. (Auth. mod.)

K-49437

Schuster, J., **Cosmic background radiation anisotropy at degree angular scales: further results from the South Pole**, *Astrophysical journal*, Aug. 1, 1993 412(2, pt.2), p.L47-L50, 16 refs.

A 30 GHz high electron mobility transistor amplifier based detector was coupled to the Advanced Cosmic Microwave Explorer, a 1 m off-axis Gregorian telescope. The authors present data that represent 64 of the total of 500 hr acquired with this system during the 1990-91 season. The data have a statistical error of 13.5 microK/pixel. These are the smallest error bars of any data set of this type published to date. The data contain a significant signal with a maximum likelihood $\Delta T/T$ is about 0.00001, under the assumption of a Gaussian sky autocorrelation function at a coherence angle of 1.5 deg. The spectrum of the signal seen is slightly less than 2σ away from the thermal spectrum expected of primordial fluctuations in the cosmic background radiation. If the source of the fluctuations is primordial, then the data are consistent with cold dark matter scenarios when normalized to the large-scale anisotropy observed by COBE; if the origin of the signal is foreground emission or another form of contaminant, then the data are marginally inconsistent with standard cold dark matter models. In either case the data are sufficiently sensitive to provide a crucial test of many models. (Auth. mod.)

K-49497

Ono, T., **Data catalogue in World Data Center C2 for Aurora, No.4**, Tokyo, National Institute of Polar Research, 1993, 184p.

The World Data Center (WDC) C2 for Aurora, established in 1981, is responsible for data collection and dissemination of all-sky camera films, visual observations, TV cameras and photometers, auroral image and particle data from satellites, geomagnetic observations, and observations of upper atmosphere phenomena associated with aurora, such as ULF, VLF and CNA activities. This catalogue summarizes the collection of data sets, data books, related publications and facilities available in the WDC-C2 for Aurora as of Feb. 1993. A list and map show the location of antarctic upper atmosphere physics stations; geomagnetic parameters are calculated with actual station heights for the epoch of 1993.

See also:

I-47584 I-47725 I-47814 I-48175 I-48177 L-48395

L. TERRESTRIAL PHYSICS

L-47487

Antoine, L.A.G., Moyes, A.B., **Agulhas Magsat anomaly: implications for continental break-up of Gondwana**, *Tectonophysics*, Oct. 1, 1992 212(1/2), p.33-44, Refs. p.42-44.

A new processing procedure is implemented on Magsat data over the southern African region and surrounding oceans. The oceanic region of the ensuing map is interpreted in this study. The anomaly map is image processed and a composite image of Magsat with Seasat data is also presented. The Agulhas high-amplitude satellite-magnetic anomaly, situated off the southeastern coast of Africa in the southwestern Indian Ocean, is clearly defined. In addition, a north-south oceanic anomaly bordering the west coast of southern Africa, including in part the Walvis Ridge anomaly, is now recognized. The Walvis Ridge and Agulhas oceanic anomalies are interpreted to represent thickened, remanently magnetized (during Cretaceous quiet times) ocean crust. Similarities between the Walvis Ridge and the Agulhas Magsat anomalies suggest a common genesis. The Agulhas anomaly is interpreted to represent the remnant scar of the process that led to fragmentation of Gondwana. It is hypothesized that fragmentation of Gondwana was initiated by an upwelling of hotter than normal asthenosphere centered directly below the Agulhas anomaly. (Auth.)

L-47488

Bozzo, E., Meloni, A., **Geomagnetic anomaly maps of central Victoria Land (East Antarctica) from ground measurements**, *Tectonophysics*, Oct. 1, 1992 212(1/2), p.99-108, Refs. p.107-108.

Results of an extensive ground geomagnetic survey over central Victoria Land, between the Transantarctic Mountains and the Ross Sea, are used to plot the residual field map of the area. The data indicate that intense positive anomalies occur along two corridors, one near Mt. Nansen and the other near Mt. Melbourne. Further elaboration of the measurements has produced 3 other geomagnetic maps. The residual field map and the high-pass filter geomagnetic map indicate that all the intense anomalies (both positive and negative) are of shallow origin. The low pass filter map and the upward continuation map show that the land mass of central Victoria Land is characterized by a weak negative geomagnetic anomaly, whereas the near-shore area, close to Terra Nova Bay, displays a weak positive anomaly. The measurements indicate that all rock types characterized by high susceptibility produce geomagnetic anomalies, even if their outcrop is not extensive. These rocks belong to the Mt. Melbourne volcanics, Jurassic dolerites and Granite Harbour plutons. None of the formations of the metamorphic complex are responsible for intense magnetic signals. (Auth. mod.)

L-47599

Medvedev, N.D., **Earth magnetic pole secular drift caused by precession of the planet's inner core and magnetic center** [Mnogovekovoï traektornyï dreïf magnitnykh poliusev Zemli kak effekt pretsessii vnutrennego iadra i magnitnogo tsentra planety], *Sovetskaia antarkticheskaia ekspeditsiia. Informatsionnyï biulleten'*, 1991 No.115, p.69-75, In Russian. 14 refs.

Maps of the secular trajectory of magnetic poles in the Northern and Southern Hemisphere are presented and analyzed. It is pointed out that the Earth's magnetic poles appear as indicators of the position and movement of the magnetic axis in determined intervals and peri-

odicity, registering in their trajectories the course of those positions in time. It is anticipated that the trajectories and movements of the antipodes will draw together after the year 2185 by increased total velocity of more than 20 km/y.

L-47667

Bozzo, E., Caneva, G., Meloni, A., Romeo, G., **Geomagnetic measurements during the Italian Antarctic Expedition in 1986-1987** [Misure geomagnetiche nella spedizione scientifica italiana in Antartide nell'anno 1986/87], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.91-95, In Italian with English summary. Reprinted from *Acqua-Aria*, 1988, 4, p.439-443. 4 refs.

Following and extending the 1985/86 geomagnetic program, three main goals were accomplished in the 1986/87 scientific expedition in Terra Nova Bay, including the installation of a summer geomagnetic observatory in the base area to record absolute values of total field F, and the vector components H, D and Z. Survey data reduction, using the observatory data for the elimination of time variations, was also made. The installation of 2 remote data acquisition systems, able to automatically record H, D and Z time variations, was made at Hayes Head and Cape Philippi. The observatory has monitored the geomagnetic field by means of a proton precession magnetometer and fluxgate magnetometers, with data being directly digitized; 64 absolute measurements have been made almost on a daily basis. (Auth.)

L-47668

Bozzo, E., Campi, S., Meloni, A., **Geomagnetic research in Terra Nova Bay area** [Ricerche geomagnetiche nel territorio di Terra Nova Bay, Antartide], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.97-103, In Italian with English summary. Reprinted from the proceedings of the 7th Annual GNGTS Meeting, Rome, Nov. 30-Dec. 2, 1988, p.1092-1098. 4 refs.

Some results of the processing of magnetometric survey data, collected in Terra Nova Bay during the Italian Antarctic expeditions from 1985 to 1988, are presented. (Auth. mod.)

L-47672

Azzara, R., **Geomagnetic observation results 1986-1987**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.139-213, In English and Italian. Reprinted from Internal Rep., P.N.R.A., 1989, 77p. 4 refs.

As part of the Italian Antartide project, a magnetic observatory was set up in the Terra Nova Bay Station area during the austral summer

of 1986-1987. The main objectives for the installation of the observatory were to serve as a reference base for magnetic survey measurements reduction; to measure the values of the field elements at the observatory and thus give absolute values and secular variation for the area; to obtain data for the study of field time variations; and to supply World Data Centers with data for the definition of International Geomagnetic Reference Field. Results are discussed and presented in tables and charts.

L-47674

Roda, C., **Geophysical exploration of the periantarctic marine platform** [Esplorazione geofisica della piattaforma marina periantartica], Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.305-333, In Italian. Reprinted from Osservatorio Geofisico Sperimentale, Internal rep., 1989, p.1-30.

Results of geophysical measurements carried out on board ship during two expeditions (1987-1988 and 1988-1989) are summarized and presented in tables. Each expedition is described in regard to its organization, itinerary, schedule and activities.

L-47675

Azzara, R., **Geomagnetic observation results 1987-1988**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.351-428, In English and Italian. Reprinted from Internal Rep., P.N.R.A., 1990, 79p. 4 refs.

A geomagnetic observatory was installed at the Terra Nova Bay Station in 1986-87. This report deals with activities undertaken during the austral summer 1987-1988; data are discussed and presented in tables. Beginning and ending dates of the activities at the observatory during the 1987-1988 expedition are as follows: total intensity F recordings—from Dec. 30, 1987 to Feb. 14, 1988; H, D, Z elements recordings—from Dec. 27, 1987 to Feb. 13, 1988; and absolute measurements (DI)—from Dec. 29, 1987 to Feb. 10, 1988.

L-47677

Azzara, R., **Geomagnetic observation results 1988-1989**, Italy. Programma Nazionale di Ricerche in Antartide. Progetto Antartide: settore Scienze della Terra. Raccolta pubblicazioni gennaio 1986-luglio 1991. (Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991), Rome, ENEA, [1991], p.451-501, In English and Italian. Reprinted from Internal Rep., P.N.R.A., 1991, 52p. 5 refs.

This report deals with activities at the antarctic Italian geomagnetic observatory at Terra Nova Bay Station, during the austral summer 1988-1989; data are discussed and presented in tables. Beginning and ending dates of the activities described in this report are the following: total intensity F recording—from Dec. 20, 1988 to Feb. 14, 1989; H, D, Z elements recording—from Dec. 25, 1988 to Feb. 11, 1989; and absolute measurements (DI)—from Dec. 31, 1988 to Feb. 7, 1989.

L-47742

Bauerschäfer, U., Stackebrandt, W., **Brief report on geomagnetic profile measurements in the vicinity of the Schirmacher Hills, Wohlthat Mountains, Queen Maud Land** [Kurzbericht über geomagnetische Profilmessungen in Bereich Schirmacher-Oase, Wohlthat Massiv, Königin-Maud-Land, Ostantarktika], *Polarforschung*, 1990 (Publ. 1992) 60(3), p.239-244, In German with English summary. 17 refs.

Ground-based geomagnetic field measurements in the area of the Schirmacher Oasis-Wohlthat Massif and in the Untersee Oasis are presented. The magnetic anomalies are discussed with respect to increasingly basic rock composition by anorthosite intrusion, ilmenite mineralization and intrusion of basic dikes during Gondwana break-up.

L-47837

Redfield, T., **Gravity transect across the Transantarctic Mountains south of the Drygalski Ice Tongue**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.143-151.

Regional Bouguer data collected in a traverse across the Transantarctic Mountains south of the Drygalski Ice Tongue have quantified the gradient, which is observed to be intermediate between those of North Victoria Land and South Victoria Land. A coastal transect connecting the Drygalski area survey with the Mt. Melbourne area shows a 60 mgal to 100 mgal jump over a short distance. The jump occurs over the David Glacier (Drygalski Ice Tongue) and Priestley Glacier drainages, both major physiographic features. No geologic evidence exists for large supra-crustal density contrasts that could explain the mass differences. It is suggested that the gravity field variations stem from deep features at the crust/mantle boundary, or in the lower crust. This leads to the inference that the Drygalski area and the Mt. Melbourne area are characterized by different root structures, and the speculation follows that the uplift histories of the two areas may well be significantly different.

L-47838

Damaske, D., **Aeromagnetic survey over the northwestern Ross Ice Shelf and the McMurdo Sound area**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.152-156, 7 refs.

As part of GANOVEX VI 1990/91, the Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), the Alfred Wegener Institute for Polar and Marine Research (AWI), and the United States Geological Survey (USGS) carried out an airborne magnetic survey over the northwestern Ross Ice Shelf and McMurdo Sound between Ross I., the Transantarctic Mountains, and Minna Bluff. The area planned for the aeromagnetic survey connected directly with the GANOVEX IV survey area which terminated along an approximately east-west line at about the latitude of Cape Bird. The GANOVEX IV survey covered the Victoria Land Basin from its northern end in the Terra Nova Bay region to its known southern end at Ross I. A possible southern extension of the Victoria Land Basin and its central graben structure, as found from seismic surveys and what has been referred to as Victoria Graben in the aeromagnetic interpretation of the GANOVEX IV data was one of the major targets for this survey. The survey was laid out in the form of blocks. A 135 km wide transect from the Transantarctic Mountains to about 175°W formed the focal block of the survey in which all major scientific objectives could be covered. Other survey blocks were planned to the south of this, but in the time available no further area could be covered. In fact, the unfavorable weather conditions made it impossible to complete even the above described main section fully.

L-47839

Meyer, U., **Aerogeophysical investigations over the Bowers Mountains, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.157-161, 5 refs.

An aerogeophysical survey was planned as a major program for the GANOVEX VI expedition over the northern coastal area of North Victoria Land, including onshore sections across the Bowers Mountains, the lower Rennick Glacier, the Wilson Hills, and the adjacent parts of the Polar Plateau. To the east of the Bowers structural zone a quiet magnetic pattern seems to be characteristic for the rocks of the Robertson Bay Terrane. Only a small section of this was covered during the GANOVEX V aeromagnetic survey. The larger part covered now will help one to understand its geotectonic setting in relation to the Bowers zone, in the context of the still open question of the existence of an extended thrust system in northeastern Victoria Land. According to the results of the GANOVEX V survey, the Rennick Graben seems to be divided by a NW-SE striking magnetic lineament. The northern section is characterized by strong positive anomalies, whilst south of this line no distinct anomalies are seen over the area covered so far. The magnetic lineament seems to continue southeast as is indicated by a few single lines crossing the area south of the densely spaced GANOVEX V grid. The few densely spaced lines flown during GANOVEX VI cover this area and will provide a better understanding of this important magnetic feature.

L-47840

Reitmayr, G., **Gravity surveys of the Mount Melbourne and the Rennick-Lillie Glacier areas, north Victoria Land, Antarctica**, *Polarforschung*, 1990 (Publ. 92) 60(2), p.162-168, 11 refs.

Earlier gravity surveys were performed in North Victoria Land around the Mount Melbourne area during GANOVEX IV and GANOVEX V. During the latter expedition an additional zone close to the north coast between Rennick and Matusovich Glaciers was surveyed. Between these two areas exist some older data, which were collected without information on ice thicknesses. Finally, gravity data are available over a long inland traverse measured some thirty years ago during the International Geophysical Year, 1963. These data seem to have a good control on ice thickness again, since they have been supplemented by seismic reflection measurements. In contrast to the northern area, a steep gradient in the Bouguer map shows up in the south, which suggests thickening of the crust towards the continent. The values decrease by approximately 250 mGal from the coast to the Polar Plateau. The break-in slope towards the continent is not yet clearly determined. The objective of the present work was the continuation of these studies, especially to condense the data and amplify the area surveyed in order to give a better structural interpretation and to perform quantitative modeling.

L-48031

Gubbins, D., Coe, R.S., **Longitudinally confined geomagnetic reversal paths from non-dipolar transition fields**, *Nature*, Mar. 4, 1993 362(6415), p.51-53, 16 refs.

It has long been thought that conditions at the boundary between the core and mantle influence the Earth's magnetic field, but the supporting evidence is rather indirect. Recent palaeomagnetic results, suggesting that there are persistent preferred longitudinal paths for the virtual geomagnetic pole (VGP) during reversals, would provide the first direct evidence of the solid mantle's influence on the core, although their statistical significance has been disputed. The results are potentially exciting because the preferred paths lie close to the Pacific rim, where the present geomagnetic secular variation changes character. Presented here is a simple model, based on an extension of a previous theory, that produces reversals with VGP paths confined within relatively narrow longitude bands despite the transition field having a substantially non-dipolar structure. Thus, although longitude bias of the VGP paths is definitive evidence for core-mantle interaction, simple VGP paths are not evidence of near-dipolar transition fields. (Auth.)

L-48035

Vila, J., **Volcanic tremors at Deception Island (South Shetland Islands, Antarctica)**, *Journal of volcanology and geothermal research*, Nov. 1992 53(1-4), p.89-102, Refs. p.101-102.

Deception I. is an active volcano located at the spreading center of the Bransfield Strait back-arc. Since 1986, the Spanish Antarctic National Program has supported geophysical and geological surveys to study seismic and volcanic activities in the area. Numerous earthquakes, with magnitudes ranging from 0.1 to 2.2, have been recorded, most of them distributed along the main fractures of the island, which coincide with the regional structural trend of the Bransfield Strait back-arc. Several types of volcanic tremors have also been recorded, all of them having high spectral stability content with few and well-defined spectral peaks. The location of the stations that record tremors, the correlation of seismic noise with the tremors and the geological characteristics of Deception I. suggest that the tremors are generally associated with geothermal noise originating in the uppermost ducts of the fumarolian system. If one considers the surficial ducts as harmonic oscillators, the motion is seen to be basically unidirectional, as is expected in the degasification of an aquifer. (Auth. mod.)

L-48274

Rouland, D., **New technology in seismological studies on Adélie Coast** [Sismologie en Terre-Adélie: nouvelles technologies, expériences nouvelles], *Expéditions polaires françaises. Missions Paul-Emile Victor. Bulletin d'information*, June 1990 No.24, p.14-24, In French with English summary. 19 refs.

The number of permanent seismological stations in Antarctica has decreased after the first intensive research during the 1957-58 International Geophysical Year. The principal serious consequence is an important bias against global and regional seismological studies. Only a few stations, such as Dumont d'Urville on Adélie Coast, have provided continuous observations with regularly updated instrumentation. New methods and instruments used at the Station are briefly described. (Auth. mod.)

L-48366

Frederick, B.C., Domack, E.W., McClennen, C.E., **Magnetic susceptibility measurements in antarctic glacial-marine sediment from in front of the Muller Ice Shelf, Lallemand Fjord, Antarctic journal of the United States**, 1991 27(5), p.126-128, 4 refs.

The primary objective of this study was to determine the specific physical characteristics of antarctic glacial-marine sediment which would affect the magnetic susceptibility readings attained from several 10 cm long cores of Smith-MacIntyre grab samples. Understanding the origin of the magnetic susceptibility reading is important because these measurements may prove to be a quick and efficient way to obtain down-core information about relative grain size, paleoclimatic data, and subsampling sites, as demonstrated in arctic fjords. This analysis was conducted using undisturbed sediment samples obtained within Lallemand Fjord along the Loubet Coast of the Antarctic Peninsula during the R/V *Polar Duke* cruise 90-7. Lallemand Fjord, which lies within the Antarctic Circle, is characterized as a polar fjord because the mean summer temperature is less than 0 C. Because of this climate and the restricted fjord setting, a small ice shelf, called the Muller Ice Shelf, is found at the head of a tributary bay within Lallemand Fjord.

L-48395

Papitashvili, V.O., **Comparison between two corrected geomagnetic coordinate systems at high latitudes**, *Journal of geomagnetism and geoelectricity*, 1992 44(12), p.1215-1224, 14 refs.

The existing corrected geomagnetic coordinate system is based on internal sources of the Earth's magnetic field and describes observed phenomena in a time-independent way. Space experiments, however, use universal time to follow the dynamics of observed phenomena in 3-dimensional space, and external sources play an important role there. A new corrected coordinate system based on the "realistic" geomagnetic equator is proposed to order observations of experiments at each moment of time. The system is based on constant B -minimum ovals at the 3-D geomagnetic equator plane. The magnetospheric model by Tsyganenko (1989) is used, and an algorithm has been developed to derive the lines of constant latitude at ionospheric heights for a specific universal time. Combining these latitudes with corrected geomagnetic longitudes provides an opportunity to order polar ionospheric phenomena in accordance with their "realistic" positions near footpoints of geomagnetic field lines. An attempt is made to interpret some results from the PACE radar experiment using the calculated latitude ovals. Data for this comparative study were obtained at Halley Station and Goose Bay, Labrador. (Auth. mod.)

L-48409

Kaminuma, K., Yamamoto, M., **Seismological bulletin of Syowa Station, Antarctica, 1991, Japanese Antarctic Research Expedition. JARE data reports**, Mar. 1993 No.185, 53p., 3 refs.

The observation system at Showa Station is shown in a schematic diagram; the frequency response of the seismometers and epicenter locations of the seismic events detected at Showa Station are shown in graphs and charts; read-out data and a list of the 409 earthquakes detected are given in tables; and an appendix contains reproductions of seismic records.

L-48466

Groushinsky, A.N., Groushinsky, N.P., Stroev, P.A., Yatsenko, E.V., **Earth's crust in Antarctica and the effective relief of the continent**, *Journal of geodynamics*, Aug. 1992 15(3/4), p.223-228, 11 refs.

On the basis that there are no available deep seismic sounding (DSS) profiles in the interior of the antarctic crust can be proposed that the thickness of the antarctic crust can be calculated by extrapolation of the measured data (obtained on the coast) from the coast to the interior of the continent. Such calculations are described. Tabulated results of regression equations solved for 5 regions, a map showing the antarctic crust thickness, and a map of effective heights of Antarctica are presented.

L-48504

Monastersky, R., **Flap over magnetic flips**, *Science news*, June 12, 1993 143(24), p.378-380.

A brief review is given of the present state of research on geomagnetic field reversals. When it became apparent that during reversals, the field lost its stability, became very complex, and seemingly maintained no identifiable flow pattern, interest in the work declined. Recently, however, two investigators independently discovered that patterns did seem to emerge as the reversals took shape. Interest in the field rekindled and scientists world-wide developed opposing sides either supporting or attacking the newly proposed theories. Sedimentary records and the role of Earth's mantle lie at the heart of the matter.

L-48523

Beaudoin, B.C., **Seismic investigations of the Earth's crust: velocity structure and tectonics, Yukon-Tanana Terrane, Alaska, and near surface effect on wave propagation, Ross Ice Shelf**, Stanford, Stanford University, 1992, 224p., University Microfilms order No. AAD93-02171, Ph.D. thesis. Refs. passim.

Two Trans-Alaska Crustal Transect (TACT) seismic refraction studies, sampling the crust beneath the Yukon-Tanana terrane (YTT), Alaska and the terranes along its northwestern boundary, are interpreted using both forward and inverse modeling techniques. These studies reveal a thin (c. 30 km), reflective middle to lower crust beneath the southern YTT and the terranes to its northwest. A coupled reflection/refraction experiment, imaging the crust beneath the Ross Ice Shelf is used to study phenomena associated with the unique acquisition environment of Antarctica's floating ice shelves. The near surface firn layer influences the data character by amplifying and frequency modulating the incoming wavefield. In addition, the ice-water column introduces pervasive, high energy seafloor, intra-ice, and intra-water multiples that have moveout velocities similar to the expected sub-seafloor primary velocities. Successful removal of these high energy multiples relies on predictive deconvolution, inverse velocity stack filtering, and frequency filtering. Removal of the multiples reveals a faulted, sedimentary wedge which is truncated at or near the seafloor and a crust that is c. 21 km thick. These results provide seismic evidence that the extensional features observed in the Ross Sea region of the Ross Embayment extend beneath the Ross Ice Shelf. (Auth. mod.)

L-48542

Shibuya, K., Ogawa, F., **Observation and analysis of the tidal gravity variations at Asuka Station located on the antarctic ice sheet**, *Journal of geophysical research*, Apr. 10, 1993 98(B4), p.6677-6688, 34 refs.

Tidal gravity observations were made at Asuka Station. The La-Coste-Romberg model G-805 gravity meter was altered to integrate an electrostatic feedback amplifier and was installed in a snow pit. Records for tidal analysis were obtained from June 26 to Nov. 13, 1987 at a sampling interval of 30 min. From the estimated tidal amplitudes, corrections for the oceanic effects were made using Schwiderski's cotidal maps. Similar tidal gravity observations made at Showa Station yielded consistent results with those monitored at Asuka Station. The observed M2 delta factors have a tendency to increase from the equator toward the southern high latitudes. The increasing effect of inaccurate ocean load tidal corrections may be due to Schwiderski's cotidal chart. Tidal analysis resulted in a gravity admittance of -0.24 ± 0.04 microGal/mbar for the air pressure change at Asuka Station. The smaller magnitude compared with the typical value of -0.35 microGal/mbar for a normal crust may be explained by the loading deformation of the ice sheet under the air mass covering an extent of 30 km over the site. (Auth. mod.)

L-48556

Trupin, A.S., **Effects of polar ice on the earth's rotation and gravitational potential**, *Geophysical journal international*, May 1993 113(2), p.273-283, 30 refs.

In this paper, gridded values of net surface accumulation rates for the Antarctic and Greenland ice sheets are used to estimate the contributions these two regions make to the earth's gravity and rotation. Results suggest very approximate upper and lower limits for both inter-annual and secular contributions of polar-ice mass balance to earth rotation and gravity. These limits are useful where they fall within the range of detectability when using satellites. (Auth. mod.)

L-48717

Muñoz, M.A., Fournier, H.G., Mamani, M., Borzotta, E., **Critical review of magnetotelluric studies in diverse tectonic areas in Argentina, Chile and Antarctica**, *Acta geodaetica, geophysica et montanistica Hungarica*, 1992 27(1), p.65-86, 29 refs.

Magnetotelluric soundings carried out during the past 15 years in Argentina along the cratonic region of Buenos Aires, the geothermal area in the provinces of Tucumán and Santiago del Estero, and in sites surrounding the Argentinian bases in the Antarctic Peninsula (Ma-

rambio and Maticenzo) were interpreted through 1D models. In this paper, these studies are reviewed in the perspective of 2D models to improve knowledge of the resistivity structure of each area and to point out differences between stable and tectonically active regions. In the case of the Antarctic Peninsula and within the border of the Weddell Sea, the data presented amplify the morphology of the sedimentary basin and the conducting layer in the zone of the Foca nunataks. (Auth. mod.)

L-48724

Humler, E., Thiriot, J.L., Montagner, J.P., **Global correlations of mid-ocean-ridge basalt chemistry with seismic tomographic images**, *Nature*, July 15, 1993 364(6434), p.225-228, 48 refs.

An attempt is made to relate analytical data from basalt chemistry and seismic velocity studies by examining the global co-variation between mid-ocean-ridge basalt chemistry and upper-mantle shear-wave velocity. A strong correlation is noted between basalt chemistry and variations in seismic velocity at depths of 100-170 km and lateral scale-lengths of 1,000-2,400 km, supporting a common thermal origin for the two types of signal. The departure of a few points from the general correlation may either reflect locally poor resolution of the tomographic model or, more interestingly, point to real anomalies that will repay closer examination. A portion of the seismic velocity data used in this study came from subantarctic regions of the Atlantic, Pacific, and Indian Oceans.

L-48966

Ihmlé, P.F., Harabaglia, P., Jordan, T.H., **Teleseismic detection of a slow precursor to the great 1989 Macquarie Ridge earthquake**, *Science*, July 9, 1993 261(5118), p.177-183, 46 refs.

Low-frequency spectra for the 1989 Macquarie Ridge earthquake (magnitude 8.2) show an amplitude increase and a phase-delay decrease below 6 millihertz that require a short-term slow precursor. This earthquake can be modeled as a compound event in which a fast-rupturing, ordinary earthquake was initiated by an episode of slow, smooth deformation that began more than 100 seconds before the main shock. The moment released in the slow precursor was large, about 300 quintillion newton-meters, equivalent to an event of magnitude 7.6. The data are consistent with the precursor being generated in a region of the oceanic upper mantle below the main rupture. (Auth.)

L-49061

Lanza, R., Zanella, E., **Palaeomagnetism of the Ferrar dolerite in the northern Prince Albert Mountains (Victoria Land, Antarctica)**, *Geophysical journal international*, Sep. 1993 114(3), p.501-511, 43 refs.

During the 6th Italian expedition to Victoria Land, Jurassic Ferrar dolerite sills were sampled at 23 sites in the northern Prince Albert Mountains. The rock magnetic properties were similar in all sites. Saturation remanence, remanent coercive force and Curie-temperature values pointed to titanomagnetite as the main carrier of magnetization. Palaeomagnetic directions were derived after AF demagnetization, and site-mean virtual geomagnetic poles (VGPs) computed for all sites but one. The site-mean VGPs distribution is clearly bimodal: 15 VGPs cluster around a palaeopole (lat. 48S, long. 226E) in good agreement with the literature data, whereas 7 VGPs are displaced toward a palaeopole at higher latitude (lat. 79S, long. 181E). The Jurassic palaeopole of East Antarctica has been recalculated from 103 VGPs available in the literature. The position is 57S, 221E when all VGPs are taken into account, and 51S, 223E when the high-latitude VGPs from Victoria Land are discarded as anomalous. (Auth. mod.)

L-49244

Kaminuma, K., **Present status of seismic network in Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.475-481, 4 refs.

At its meeting in São Paulo, Brazil in July 1990 the Working Group on Solid Earth Geophysics (WG/SEG) of the Scientific Committee on Antarctic Research decided to review the present status of earthquake seismology in Antarctica. The author was nominated to undertake the review. Accordingly, a questionnaire was sent out to the group members of WG/SEG. A preliminary report was made at the informal meeting of WG/SEG in Sep. 1991 and additional information was obtained later. Thirteen countries operated a total of 16 seismic stations including 4 broadband digital stations in Antarctica in 1990-91. (Auth. mod.)

L-49245

Fukuda, Y., Segawa, J., Kaminuma, K., **Determination of the gravity field around Antarctica using satellite altimeter data and surface gravity data—A review of the recent studies**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.489-491, 20 refs.

Some problems in the simultaneous use of different kinds of gravity field data for the determination of the gravity field around Antarctica are discussed. Since ground and/or sea truth data in the antarctic region are limited, the use of remote sensing data is a key for geophysical studies. From this point of view, combined use of satellite altimeter data and surface gravity data by means of a least squares collocation (LSC) method is demonstrated. Recent developments in space technology provide many different kinds of gravity field data. Thus the studies of a method like LSC should be emphasized to avoid the confusion among the data of different quality and to utilize them effectively. (Auth.)

L-49246

Kaminuma, K., Akamatsu, J., **Intermittent micro-seismic activity in the vicinity of Syowa Station, East Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.493-497, 10 refs. For another version see 20L-46192.

A tripartite seismic array was established at Showa Station in 1987 for studying the local seismicity; 10 micro-earthquakes were recorded from June 1987 to Jan. 1989. These earthquakes were located in the geological and geomorphological structural boundaries of the coastal area on the antarctic continent and offshore. There are many well-developed elevated beaches and marine terraces in the coastal ice-free area of the antarctic continent. These were formed by the relative lowering of sea level, caused by the crustal uplift after deglaciation. The local micro-earthquakes seem to be caused by the tectonic stresses which are accumulated by the slow-moving crustal uplift. A trend of the lowering of sea level at Showa Station at a rate of about 1 cm/y was found using data from 1981 to 1987. The micro- and small earthquakes which were recorded during 1987-1990 correspond well with the inferred crustal uplift of 1 cm/y. (Auth.)

L-49248

Nagasaka, K., Kaminuma, K., Shibuya, K., **Seismological observations by a three-component broadband digital seismograph at Syowa Station, Antarctica**, Recent progress in antarctic earth science. Edited by Y. Yoshida, Tokyo, Terra Scientific Publishing Company, 1992, p.595-601, 2 refs. For Japanese version see 20L-46743.

A three-component broadband STS (Streckeisen Seismometer) seismograph was installed at Showa Station in 1989 to obtain precise

digital seismic records for the study of the earth's interior and earthquakes. The STS observation system at Showa is described and some examples of digital seismograms are given. The STS system has two different outputs, BRB (Broad-Band) and LP (Long-Period), with a dynamic range of at least 120 dB. Seismic signals are recorded in digital form together with analog seismogram for monitoring. The BRB output is currently recorded with a long-term thermal pen recorder and a digital recording system using personal computers. The LP output is recorded with pen recorder and a cassette logger. Well recorded events, most of which are large, are compiled onto floppy disks from the digital recording system approximately once a week. Some examples of the digital records were transmitted successfully to the National Institute of Polar Research in Japan via the satellite telecommunication system from Showa Station. (Auth.)

L-49267

Gubbins, D., Kelly, P., **Persistent patterns in the geomagnetic field over the past 2.5 Myr**, *Nature*, Oct. 28, 1993 365(6449), p.829-832, 15 refs.

Historical geomagnetic measurements covering the past 400 years reveal a symmetrical pattern of four relatively stationary flux concentrations ('lobes') at the surface of the liquid core and regions of rapid change extending from the Atlantic to the Indian Ocean. Palaeomagnetic data define a time-average over several thousand years which might reflect the stationary parts of the present field, but unfortunately the historical record is too short to provide a satisfactory average. Modelled here are palaeomagnetic directions from the past 2.5 Myr using the same methods as for modern data. The two northern lobes are found in the same position as today, over Arctic Canada and Siberia. In southern regions, by contrast, the field appears to have been smoothed out, as might be expected from the current rapid secular variation. It is proposed that the present geomagnetic field morphology and pattern of secular variation have persisted for several million years, as would occur if the solid mantle controls flow at the top of the core. Data for the figures are analyzed to include the antarctic continental coast line.

L-49360

Powell, C.M., **Paleomagnetic constraints on timing of the Neoproterozoic breakup of Rodinia and the Cambrian formation of Gondwana**, *Geology*, Oct. 1993 21(10), p.889-892, 32 refs.

Paleomagnetic data from East Gondwana (Australia, Antarctica, and India) and Laurentia are interpreted to demonstrate that the two continents were juxtaposed in the Rodinia supercontinent by 1050 Ma. They began to separate after 725 Ma, allowing the formation of the Pacific Ocean. The low-latitude Rapitan and Sturtian glaciations occurred during the rifting that led to continental breakup. East Gondwana remained in low latitudes for the rest of the Neoproterozoic, while Laurentia moved to polar latitudes by 580 Ma. During the Vendian, a wide Pacific Ocean separated the two continental land masses. The younger Marinoan, Ice Brook, and Varangian glaciations in the early Vendian preceded a second continental breakup in the late Vendian, causing formation of the eastern margin of Laurentia and rejuvenation of its western margin. Paleomagnetic data indicate that Gondwana was not fully assembled until the end of the Neoproterozoic, possibly as late as Middle Cambrian. (Auth.)

L-49451

Kuehne, J., Johnson, S., Wilson, C.R., **Atmospheric excitation of nonseasonal polar motion**, *Journal of geophysical research*, Nov. 10, 1993 98(B11), p.19,973-19,978, 11 refs.

Analysis of nonseasonal polar motion excitation and atmospheric mass equatorial angular momentum (EAM) over land for the period 1980-1989 reveals a clear pattern of high power and correlation during the Northern Hemisphere (NH) winter followed by low power and

correlation during the NH summer. A special case of this pattern occurs for longer than 14 months (from Jan. 1987 to Mar. 1988) when the correlation throughout the NH summer remains statistically significant. During the Southern Hemisphere (SH) winter there is significant correlation between the atmospheric EAM over mid-latitude southern oceans and polar motion excitation, indicating the existence of a dynamic atmosphere-ocean excitation. The atmospheric excitation power is too small to explain the large correlation during the NH winter. The effects of winds probably account for the deficit in power. The implication of these results is that there are two main excitation sources, each dominant at different seasons. Atmospheric mass redistribution over land forces polar motion during the NH winter, and a dynamic atmosphere-ocean response is important during the SH winter. (Auth. mod.)

See also:

B-47933 C-47733 D-47816 E-47564 E-47665 E-47969 E-47994
E-48018 E-48099 E-48113 E-48726 E-48800 E-48823 E-48843
E-48902 E-48968 E-48969 E-49022 E-49053 E-49182 E-49243
E-49263 F-48129 F-48825 F-49247 I-47584 I-47801 I-49253

M. POLITICAL GEOGRAPHY

M-47378

Watts, A., **International law and the antarctic treaty system**, Hersch Lauterpacht Memorial Lectures, Vol.11, Cambridge, Grotius Publications Limited, 1992, 469p., Refs. p.451-460.

This book provides an up-to-date survey of the legal framework governing antarctic activities. Reflecting the increase of interest and activity in the region, the work examines the basic Antarctic Treaty of 1959 and the subsequent major additional instruments and regulatory measures to provide a clear and authoritative picture of the antarctic legal system as a whole. It is demonstrated how the Antarctic Treaty System is an important contribution to international law generally, notwithstanding the unique characteristics which set Antarctica apart from other regions of the world. Individual chapters treat the evolution of the Antarctic Treaty System; dispute settlement; territorial questions; antarctic seas; jurisdiction, enforcement, and liability; provisions for non-militarization and non-nuclearization of the region; natural resources; environmental protection measures and procedures; and the legal status of the ATS. Full texts of all the legal instruments comprising the ATS, from the Antarctic Treaty through the protocol on environmental protection agreed to in Madrid in 1991, are included.

M-47929

Carvallo Cruz, M.L., **Antarctic Treaty Consultative Parties meetings** [Las Reuniones Consultivas del Tratado Antártico], *Boletín antártico chileno*, Oct. 1992 11(2), p.13-16 and 21, In Spanish.

The political and legal background leading to the formation of the Antarctic Treaty Consultative Parties (ATCP) is reviewed, and highlights of activities carried out during the 17 meetings of the ATCP between July 1961 and Nov. 1992 are discussed. Tabulated chronological data include information such as date of meeting, city, country, and number of approved recommendations.

M-48084

Welch, W.M., **Antarctic Treaty System: is it adequate to regulate or eliminate the environmental exploitation of the globe's last wilderness?**, *Houston journal of international law*, Spring 1992 14(3), p.597-657, 347 refs.

This paper traces the development of the Antarctic Treaty System (ATS) from the early years of the first continental human activity through the most recent environmental addition to the Treaty. Sections 2 and 3 provide a physical and historical backdrop for the legal analysis that follows in sections 4-6. A brief introduction to the inhospitable antarctic landscape is followed by discussions of the minerals potential and possible environmental damage to the continent. A synopsis is presented of early exploration efforts along with a description of the various types of territorial claims made by individual states, and a discussion of the Treaty's formation and operation. A critical analysis of the Treaty at this important juncture includes a discussion of the perceived failures of the ATS as well as recommended solutions. Recent events that led to the downfall of CRAMRA and the rise of the environmental protocol are examined, and the impact and adequacy of the protocol, as it makes its way through domestic ratification procedures around the globe, are explored.

M-48198

Rothwell, D.R., **Antarctic Treaty: 1961-1991 and beyond**, *Sydney law review*, Mar. 1992 14(1), p.62-85, 147 refs.

The author concludes, after a detailed analysis, that the Antarctic Treaty during its first 30 years has indeed proved to be a remarkable document. On its face a rather simple treaty, it has successfully provided the basis for the development of a regime which has kept Antarctica free of conflict and open to scientific research. Given that this has been achieved during a period of great change in both international law and international relations, is evidence not only of the success of the Treaty and those responsible for its negotiation, but also of the commitment of the parties to the creation of a demilitarized and peaceful continent which serves as a natural scientific laboratory. The speedy negotiation of a new environmental regime, if effectively implemented and developed, has the potential to infuse the Antarctic Treaty System with a fresh focus on antarctic environmental management.

M-48199

Seach, S.A., **Conflicting interests in Antarctica: people or nature? Who decides?**, *Temple international and comparative law journal*, Spring 1991 5(1), p.109-143, 298 refs.

Due to concern for the antarctic environment, this article initially addresses whether the United States will take a leadership role in the movement to protect Antarctica's environment. Emphasis is placed upon both mining issues and the equally important area of environmental protection from nonmining activities. Next, the article discusses whether the current regime will expand its membership to include more nations (i.e., nontreaty member nations) in the decision-making process of Antarctica's future. To understand the structure in which antarctic issues are determined, the article begins with a general discussion of the Antarctic Treaty Regime.

M-48200

Opeskin, B.R., Rothwell, D.R., **Australia's territorial sea: international and federal implications of its extension to 12 miles**, *Ocean development and international law*, Oct.-Dec. 1991 22(4), p.395-431, Refs. p.422-431.

In Nov. 1990, Australia extended its territorial waters from 3 to 12 nautical miles. This article examines the consequences of the extension under international and municipal law, and draws comparisons with the experience of the United States and Canada in relation to their territorial waters. The expansion of Australia's territorial waters has some noteworthy features under international law in its effect on Australia's territorial claims in the Antarctic. The Australian settlement may prove a useful model for federations trying to reach an agreement over offshore areas. (Auth. mod.)

M-48401

Genest, E.A., **Non-governmental organizations and the Antarctic Treaty System** [Las organizaciones no gubernamentales y el Sistema del Tratado Antártico], *Buenos Aires. Instituto Antártico Argentino. Publicación*, 1992 No.23, 73p., In Spanish with English and French summaries. 17 refs.

Based on the text of the Antarctic Treaty and the detailed analysis of its recommendations and supplementary conventions, the activities of non-governmental organizations with interests in the protection and conservation of the antarctic environment and its resources are reviewed. The emphasis is on the steady attitude maintained by ASOC and Greenpeace, both environmental defenders which in a

continuous and persuasive action were admitted to the meetings held within the frame of the Antarctic Treaty System. It is noted how the proposals from the non-governmental organizations were shaped into the text of the Madrid Protocol. (Auth.)

M-48415

Yoshida, Y., **Comprehensive protection measures on antarctic environment**, *Polar news*, Mar. 1992 No.54, p.51-56, In Japanese.

The Protocol on Environmental Protection to the Antarctic Treaty was adopted on Oct. 3, 1991, at the 11th Antarctic Treaty Special Consultative Meeting in Madrid. The history of environmental protection in the Antarctic Treaty, going back to the first consultative meeting in 1961, is summarized. There were four sessions of the 11th Consultative Meeting in 1991, of which one was in Viña del Mar, Chile, and the other three in Madrid. Among the issues discussed were MARPOL 73/78, that is, provisions dealing with marine pollution adopted in 1973 and amended in 1978. The provisions of the Protocol, including IEE (Initial Environmental Evaluation), and CEE (Comprehensive Environmental Evaluation) are summarized.

M-48446

Poole, M., **Liability for environmental damage in Antarctica**, *Journal of energy and natural resources law*, 1992 10(3), p.246-266, 95 refs.

The prospect of mineral development in Antarctica by several sovereign nations raises the issue of liability of related environmental damages. The question of liability for environmental damage and the way in which such liability is dealt with in international law is addressed, followed by an analysis of sovereignty debate concerning antarctic resources. The principles of international law and of several treaties discussed illustrate some progress toward global consensus on policies for enforcing environmental protection. However, these advances cannot solve the problems arising from the absence of one or more powers recognized internationally as having territorial sovereignty over Antarctica.

M-48564

Vinuesa, R.E., **Antarctic Treaty System: objectives and principles** [El Sistema Antártico: propósitos y principios], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.13-18, In Spanish.

A review is presented of various Articles of the Antarctic Treaty relating to the organization and function of the Consultative Parties and the emergence of the Antarctic Treaty System. Aspects of international cooperation in scientific research, and exploitation of antarctic resources in the system's framework, are analyzed.

M-48565

Armas Barea, C.A., **Concepts of "Mankind's interest" and "Common property of mankind"** [Los conceptos de "Interés de la humanidad" y "Patrimonio común de la humanidad"], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.19-35, In Spanish. Refs. p.33-35.

In discussing new conceptualizations in contemporary international law, it is argued that the two concepts, common property of mankind (CPM) and mankind's interest (MI), are definitely not synonymous. An analysis is made of their linguistic evolution and confusing character, due in part to human subjectivity and interpretative differences, and of their applicability to different terrestrial end ex-

traterrestrial regions. In conclusion, it is proposed that the MI concept is older and more encompassing than the CPM, and that—in the light of 10 legal points presented—Antarctica cannot be considered common property of mankind.

M-48566

Moncayo, G.R., **Antarctica: condition of territorialist states** [Antártida: Condición de los Estados territorialistas], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.37-47, In Spanish. 8 refs.

The legal position of the 7 states with territorial claims in Antarctica—Argentina, Australia, Chile, France, Great Britain, New Zealand and Norway—is examined in the light of the regulations of Article 4 of the Antarctic Treaty. The interests of the non-claimant states who are part of the Antarctic Treaty, and their position toward the territorialist states, are reviewed. It is found that the persistent position of the territorialist states has not hindered the evolution of the antarctic system, adapting to the changing needs of the international community in striving for cooperation to preserve the antarctic environment.

M-48567

Gutiérrez Posse, H.D.T., **Antarctica and treaties which establish an objective regime** [Los tratados que establecen un régimen objetivo y la Antártida], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.49-54, In Spanish. 10 refs.

It is argued that the system established by the Antarctic Treaty in the interest of all mankind has generated an objective regime which is contestable *erga omnes*. The article points out two aspects of the following issue: the regime's basic principles—regarding peace, science and environment—are imposed on the international community and are sustained by a delicate political equilibrium.

M-48568

Nascimbene de Dumont, N., **Antarctic Treaty System and the United Nations** [El Sistema del Tratado Antártico y las Naciones Unidas], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.55-60, In Spanish.

An analysis is presented of the relationship between the Antarctic Treaty System and the United Nations, manifest in two coexisting forms of conflict and collaboration. Articles of the Treaty, and various recommendations approved during different Consultative meetings, are examined as evidence of the dual forms of interaction between the two systems.

M-48569

Cullen, D.S., **Prospects for the "Antarctic question" in the United Nations** [Perspectivas de la "Cuestión de la Antártida" en las Naciones Unidas], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.61-67, In Spanish.

The analysis of a number of factors presented, including the evolution of the antarctic question in the last few years, leads the author

to conclude that the United Nations' interest in that question will not only continue but will surely increase, sustained by the process of growing participation of new countries, inside and outside of the Antarctic Treaty, in the debate of antarctic issues.

M-48570

Colacrai de Trevisan, M., **Acting states, government and non-government organs in the Antarctic Treaty System** [Actores estatales, organismos gubernamentales y no gubernamentales en el Sistema Antártico], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.69-76, In Spanish. 1 ref.

The evolution of the Antarctic Treaty System—its function, activities, the growing participation of the acting states and government and non-government organs' interest in Antarctica—are reviewed. It is pointed out that the pressures that civil societies exert on their governments to adopt decisions, such as change of government or parliamentary majority, could result in significant changes in the antarctic policy of many states.

M-48571

Blanco, C.L., **ASEAN and the Antarctic Treaty System** [ASEAN y el Sistema del Tratado Antártico], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.77-81, In Spanish.

The integral countries of the Southeastern Asian Association (ASEAN)—Brunei, Daru'l Salam, Indonesia, the Philippines, Malaysia, Singapore and Thailand—are discussed in terms of their antarctic policy, singly and as a group. It is pointed out that Malaysia's interest in Antarctica is not shared by the other ASEAN members.

M-48572

Otero, J.D., Jr., **Antarctica facing the 1990s** [La Antártida ante la década del '90], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.83-90, In Spanish.

On the premise that the growing interest of the international community is creating a crisis in the Antarctic Treaty System, an attempt is made in this essay to determine which are the principal hypotheses and variants that will have to be dealt with in considering the antarctic question, and what alternatives they could offer for the preservation of different interests of the Consultative Parties.

M-48573

Guyer, R.E., **Evolution of Antarctica in the 20th century** [La Antártida: su evolución en el siglo XX], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.91-101, In Spanish.

A review is presented of the evolution of territorial claims, particularly by Argentina, Australia and Chile, the position of non-claimant countries, and the events leading to the implementation of the Antarctic Treaty. Political and legal aspects of the Treaty's Articles as they affect ecology, economic development, conservation and international cooperation in Antarctica are examined.

M-48576

Oliveri López, A.M., **Convention on the Conservation of Antarctic Marine Living Resources** [Convención para la Conservación de los Recursos Vivos Marinos Antárticos], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.121-132, In Spanish. 17 refs.

Negotiations resulting in the Convention on the Conservation of Antarctic Marine Living Resources are described. The Convention's objectives, institutional mechanisms, political and legal clauses, and its effect on national interests (fisheries in particular), are analyzed.

M-48584

Otero, J.D., Jr., **Conservation of living resources and environmental protection** [Conservación de recursos vivos y protección del medio ambiente. Normatización en el Tratado Antártico y en las Convenciones vinculadas a él. Resultados], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.203-207, In Spanish.

The Antarctic Treaty norms and those of related Conventions, such as CCAMLR, CRAMRA and other organizations, are examined in the light of their effectiveness in conserving antarctic resources and protecting the environment.

M-48587

Molinari, A.E., **Protocol on Environmental Protection to the Antarctic Treaty** [Protocolo al Tratado Antártico sobre Protección del Medio Ambiente], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.223-231, In Spanish. 13 refs.

Negotiations leading to the Protocol on Environmental Protection to the Antarctic Treaty signed in Madrid on Oct. 4, 1991 are briefly reviewed. The Protocol is discussed from the following points of interest: instrumentality, area of applicability, infrastructure, implementation, and the antarctic mineral regime and environmental protection.

M-48589

Beltramino, J.C.M., **Uses of antarctic ice** [Utilización de hielos antárticos], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.241-247, In Spanish. 7 refs.

The principal characteristics of antarctic land and marine ice are described. The legal aspects of possible exploitation of antarctic ice are examined, and the lack of regulations in that regard, not only in the Antarctic Treaty but also in various conventions on antarctic resources, is pointed out. Technical and economic aspects are considered, and an Argentine proposal for the regulation of activities related to ice use is discussed.

M-48590

Fraga, J.A., **Strategic position of Antarctica under the Antarctic Treaty System** [Condición estratégica de la Antártida bajo el Sistema del Tratado Antártico], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.251-259, In Spanish. 12 refs.

The air, sea and land strategic advantages and disadvantages of Antarctica, regarding military activities and the use of nuclear power in case of a regional or world conflict, are evaluated in the light of the pertinent Antarctic Treaty Articles.

M-48595

Beltramino, J.C.M., **Current orientation of the Antarctic Treaty System and future prospects** [Orientación actual del Sistema del Tratado Antártico y perspectivas para el próximo futuro], Antártida al iniciarse la década de 1990 (Antarctica at the beginning of the 1990 decade). Edited by C.A. Armas Barea and J.C.M. Beltramino, Buenos Aires, Ediciones Manantial, 1992, p.295-300, In Spanish.

Operational aspects of the Antarctic Treaty System and a chronology of the System's evolution are discussed, with particular emphasis on recommendations and decisions resulting from various international conferences regarding the protection of the antarctic environment.

M-48664

Harris, C.M., Meadows, J., **Environmental management in Antarctica: instruments and institutions**, *Marine pollution bulletin*, 1992 25(9-12), p.239-249, 67 refs.

Instruments and institutions for environmental management in Antarctica have evolved from beginnings in the Antarctic Treaty, with subsequent introduction of the Convention for the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources, and recommendations made at Treaty meetings. The Protocol on Environmental Protection to the Antarctic Treaty will improve existing provisions for environmental management in Antarctica. When it enters into force the Protocol will apply to all activities in the Treaty area: it provides rules for environmental impact assessment, conservation of fauna and flora, disposal of wastes, prevention of marine pollution and specially protected and managed areas. The Protocol's Committee for Environmental Protection will facilitate discussion and advice on environmental management. Management of information is a vital part of ensuring that measures are effective. The Protocol should be ratified quickly to improve the basis for environmental protection, but the test will be whether and how it is implemented in practice. (Auth.)

M-48667

Sabella, S.J., **Upon closer inspection...**, *Marine pollution bulletin*, 1992 25(9-12), p.255-257.

Article VII of the Antarctic Treaty opens "all areas of Antarctica, including all stations, installation and equipment...at all times" to inspection by observers of all Contracting Parties. Article VII guarantees this right of inspection as a means to "promote the objectives and ensure the observance of the provisions" of the Treaty. Freedom of inspection strengthens the Treaty's core principles of peace and international cooperation and more importantly, the provisions of Article IV temporarily reconcile the sovereignty issue between claimant and non-claimant states. To date, however, Article VII has been greatly underutilized as a means to better protect the antarctic environment. Greenpeace, through its experience in the Antarctic, has come to realize that a formal international inspectorate and regulatory authority is needed for compliance monitoring, comprehensive and long-term environmental baseline monitoring, information manage-

ment and exchange, and the effective management of the natural resources and values of the entire Antarctic. (Auth.)

M-48711

Machowski, J., **Status of polar ice under international law**, *Polish polar research*, 1992 13(2), p.149-175, 84 refs.

Ice constitutes physically, but not legally, a separate element of polar regions, along with land, water and air. Lack of clear legal regulations in this respect compels the practitioners to apply often inadequate analogies. The specific status of polar permanent and floating ice calls for urgent and comprehensive legal regulation under general international law, the law of the sea and the law of polar regions, on the basis of the principle of arctic sectors in the Northern Hemisphere and the Antarctic Treaty System in the Southern Hemisphere, with reference to the relatively rich legal doctrine as discussed in detail in this article. (Auth.)

M-48729

Kaye, S., Rothwell, D.R., **Australian law in Antarctica**, *Polar record*, July 1993 29(170), p.215-218, 13 refs.

This article examines the content and ramifications of an Australian Parliamentary Committee's Report on the application of Australian law in the Australian Antarctic Territory (AAT). The Report's main findings suggest that Australian law should be more vigorously applied in Antarctica, and that current practices with regard to the operation and enforcement of Australian law are perceived as damaging to Australian sovereignty. This is particularly the case in the context of the virtual non-application of law to all foreign nationals within the AAT, to an extent far beyond the categories of persons exempted by Article VIII of the Antarctic Treaty. The article also discusses the possible ramifications and difficulties of giving effect to the Report's findings. Particular stress is placed upon the impact of asserting a 200-nautical-mile fishing or exclusive economic zone in the waters off the AAT, as well as the logistic difficulties that may become apparent if Australian sovereignty is more actively asserted. In this context, brief consideration is given to the Report's recommendations relating to the antarctic environment and tourism within the AAT. (Auth.)

M-48892

Viall, J.D., **South Africa: the road to the Antarctic Treaty**, *South African journal of antarctic research*, 1991 21(2), p.125-128, 4 refs.

The circumstances and events associated with South Africa's early involvement in antarctic matters in the years leading up to the signing of the Antarctic Treaty are briefly reviewed. Particular attention is given to the Republic's non-claimant status within the treaty system, and its efforts to obtain international recognition of its interests in Antarctica. (Auth.)

M-49002

Machowski, J., **Antarctic environmental legal regime**, *Polish polar research*, 1992 13(3-4), p.183-214, 87 refs.

The article provides a general overview of environmental protection and conservation practice in the Antarctic Treaty area, with special reference to the stipulations of the 1991 Protocol on Environmental Protection and its Annexes. (Auth.)

M-49170

Verbeek, P.J.M., **Role of the Netherlands as a new consultative party to the Antarctic Treaty**, *Circumpolar journal*, 1992 7(1-2), Symposium Antarctica: research and nature conservation, future prospects. Proceedings, p.147-155.

The potential role of the Netherlands as a consultative party, and their policy objectives for the immediate future are addressed, along

with some basic reflections regarding the Antarctic Treaty, the Antarctic Treaty System and the consultative mechanism as such.

M-49217

Beck, P.J., **United Nations and Antarctica, 1992: still searching for that elusive convergence of view**, *Polar record*, Oct. 1993 29(171), p.313-320, 27 refs.

The tenth successive annual UN session on the 'Question of Antarctica' took place at the close of 1992. The UN First Committee considered the topic during the week following the close of the 17th Antarctic Treaty Consultative Meeting held at Venice. The passage of yet another resolution critical of the Antarctic Treaty System (ATS) suggested that little had changed as compared to previous sessions. However, during 1992, UN reports and discussions displayed evidence of a growing acknowledgement of a range of positive developments on the part of the ATS, most notably the benefits accruing from the Protocol on Environmental Protection's designation of Antarctica as "a natural reserve, devoted to peace and science" in which mining is prohibited. Significantly, both critics and the German spokesman for the Antarctic Treaty parties (ATPs) expressed satisfaction with the concerted approach towards Antarctica embodied in Agenda 21 of the UN Conference on Environment and Development (UNCED), which met at Rio de Janeiro in June 1992. As a result, ATPs agreed to ensure that research products were freely available to the international community. In Dec. 1992 the adoption of UN resolution A47/57 reaffirmed the continuing divide between ATPs and other members of the international community regarding the management of Antarctica, even if the UNCED-type formula offers one route back to consensus when the UN takes up the topic again at the close of 1993. (Auth. mod.)

M-49275

Joyner, C.C., **Ice-covered regions in international law**, *Natural resources journal*, Winter 1991 31(1), p.213-242, 75 refs.

DLC K14.A868

Permanent ice covers more than one-tenth of the earth's land surface, and seasonal ice covers one-tenth of the world's ocean surface. Yet the international legal regime for jurisdiction over ice remains incomplete and unclear. This is especially true in the Antarctic where serious legal questions persist over sovereign claims to that continent. This study examines various ice structures and aims to clarify their legal status. Ice forms analyzed include glacier ice, sea ice, shelf ice, icebergs, and ice islands. The conclusion of this study is obvious: as fresh water becomes more scarce, so too will exploitation of polar ice forms become more attractive. What is needed is more serious attention to fix the status of ice under international law, so that its legal relationship with the rest of the earth's environment can be clearly established. (Auth.)

M-49290

Sahurie, E.J., **International Law of Antarctica**, Dordrecht, Martinus Nijhoff Publishers, 1991, 612p., Refs. passim.

DLC JX4084.A5S24

The aim of this book is to explain and appraise how international law has been shaped as a tool to facilitate the use of the many resources of Antarctica, why the developments which have taken place until now have occurred, what is likely to happen in the future, and how all the potentially relevant parties in the international legal process can act to fashion a better law with greater dividends for all. In the first part, the continent of Antarctica is set in its global context as part of a world social and world power process. The basic claims that those who are concerned with Antarctica have made about establishing, maintaining through time, or changing the key institutions for making decisions, are identified. The bulk of the book is concerned with these claims. The methodology employed involves a precise identification of each congeries of claim; a specification of the community policies which are relevant to it; an examination of the flow

of decisions on the use or resource in question; the conditioning factors which influenced those decisions; projections or speculations about lines of future decision with regard to the claim; and suggestions of alternatives that might lead to a greater approximation of outcomes with community interest. The book concludes with an examination of claims relating to uses of air space over Antarctica.

M-49438

Mervis, J., **Science cedes ground to environmental concerns**, *Science*, Aug. 6, 1993 261(5122), p.276.

In 1991, 26 countries as consultative parties signed an environmental protocol to the Antarctic Treaty aimed at minimizing the human impact on the antarctic environment. As the U.S. Congress began developing the enabling legislation, it sought advice on the matter from the National Research Council (NRC). NRC responded that NSF should cede authority for regulating scientific activities having a major impact on the environment to the EPA. NSF argues against this proposal, citing its recent record of assigning more funds toward environmental concerns and protesting that science programs will be the losers if such authority is ceded. It remains now for the Congress to settle the matter through legislation.

M-49457

Comerci, S.M., **Argentina, Chile, Great Britain and Antarctica in the 1940s** [Argentina, Chile, Gran Bretaña y la Antártida en la década del cuarenta], *Buenos Aires. Instituto Antártico Argentino. Contribución*, 1992 No.362, 26p., In Spanish with English, German and French summaries. 20 refs.

An account is given of the political positions and overlapping claims on Antarctica by Argentina, Chile and Great Britain during the 1940s. Various documents are presented in chronological order recording correspondence, meetings and treaties between the governments of Argentina and Chile (1941, 1947 and 1948), Argentina and Great Britain (1943, 1947 and 1948), and Argentina and Venezuela (1948).

M-49469

Schatz, G.S., **Environmental regulation in the Antarctic**, *Dickinson journal of environmental law and policy*, 1992 1(2), p.99-116, 106 refs.

This paper was presented on Oct. 26, 1991 at the Dickinson School of Law as part of the Symposium on Environmental Regulation: The Global Perspective. It examines the international and domestic legal aspects of four subjects of concern in environmental protection policy and practice in U.S. antarctic involvement: protection against anthropogenic perturbation of biological research sites in the vicinity of Palmer Station; environmental impact assessment; waste disposal; and the U.S. National Science Foundation's own regulatory responsibilities. It is argued that although Antarctica is not unprotected, there is a need for far more attention to purpose, enforceability, and efficacy of environmental regulation.

M-49478

Colacrai de Trevisan, M., **Superpowers and the European Economic Community as examples of selective cooperation in Antarctica** [El mundo desarrollado en la Antártida: las superpotencias y la Comunidad Economica Europea, ejemplos de cooperación selectiva], Rosario, Argentina, Promoepa, 1986, 45p., In Spanish. 35 refs.

DLC JX4084.A5C65

An analysis is made of the U.S. and Soviet policies in Antarctica, and the participation of the EEC, to determine the ways in which they implement their objectives in Antarctica and how they deal with collaborating in certain essential activities. The purpose of this re-

view is to sharpen the perception that Argentina must have of its own activities in order to develop an antarctic policy within an international framework.

M-49479

Bush, W.M., ed, **Antarctica and International law: a collection of inter-state and national documents**, New York, Oceana Publications, Inc., 1991, var. p.

DLC KWX342.3.A58

This is a part of a collection of documents on Antarctica covering the last decade, presented as Binder I of looseleaf volumes which will be based on the division of material in the first three casebound volumes. Documents will be arranged chronologically under the country or other part to which they principally relate. This first issue (Release 91-1) is dedicated to updating part 1 of the book on the Antarctic Treaty regime. The issue consists of the burgeoning reports of the consultative meetings since 1983 and with them the meeting documents which are now generally released for all but the most recent consultative meeting. The following material is enclosed: Prefatory materials; overall table of contents; and 7 booklets (Booklets AT1-AT7).

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Pliocene-Pleistocene seismic stratigraphy of the Ross Sea: evidence for multiple ice sheet grounding episodes [1992, eng] **E-48128**
- Altabet, M.A.**
Glacial to interglacial changes in surface nitrate utilization in the Indian Sector of the southern ocean as recorded by sediment *delta*N-15 [1992, eng] **J-49436**
Glacial/interglacial changes in sediment rain rate in the SW Indian sector of subantarctic waters as recorded by Th-230, Pa-231, U, and *delta*N-15 [1993, eng] **J-49488**
- Altstatt, J.**
Bacterivory in McMurdo Sound: 1. Grazing by heterotrophic nanoflagellates [1991, eng] **B-47524**
- Amoruso, A.**
Absolute determination of the cross sections of ozone in the wavelength region 339-355 nm at temperatures 220-293 K [1991, eng] **I-47688**
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AMLR program: Water masses in the vicinity of Elephant Island [1991, eng] **J-47871**
- ANARE Club**
Aurora, Dec. 1992, Vol.12, No.2 [1992, eng] **A-48020**
Aurora, June 1992, Vol.11, No.4 [1992, eng] **A-49346**
Aurora, Mar. 1993, Vol.12, No.3 [1993, eng] **A-49347**
Aurora, June 1993, Vol.12, No.4 [1993, eng] **A-49348**
Aurora, Sep. 1993, Vol.13, No.1 [1993, eng] **A-49349**
- Anav, A.**
Aerosol optical depth in Antarctica: the Rayleigh scattering contribution in the UV [1992, eng] **I-47397**
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- Andersen, B.G.**
Glacial history of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48078**
- Andersen, D.T.**
Perennial ice covers and their influence on antarctic lake ecosystems [1993, eng] **F-48637**
- Andersen, D.W.**
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Skeletal and isotopic composition and paleoclimatic significance of Late Pleistocene carbonates, Ross Sea, Antarctica [1993, eng] **E-47932**
Evidence for a grounded ice sheet on the Ross Sea continental shelf during the Late Pleistocene and preliminary paleodrainage reconstruction [1992, eng] **E-48126**
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- Anderson, J.J.**
Structure of the Sentinel Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48077**
- Anderson, M.R.**
Dynamics of bacterioplankton growth in McMurdo Sound, Antarctica: evidence for substrate sufficient growth [1991, eng] **B-47527**
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- Anderson, P.S.**
Evidence for an antarctic winter coastal polynya [1993, eng] **F-48444**
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Pa-231/Th-230 ratios in sediments as a proxy for past changes in southern ocean productivity [1993, eng] **J-48030**
- Andre, J.C.**
Katabatic winds of Adélie Coast. The IAGO project results [1990, fre] **I-48276**
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Millimeter observations of the Magellanic Clouds [1991, eng] **K-47726**
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Highly potassic basaltoids of the Manning Massif [1992, rus] **E-48868**
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Reexamination of the relation between depth of the antarctic ozone hole, and equatorial QBO and SST, 1962-1992 [1993, eng] **I-49085**
- Antarctic journal of the United States**
Antarctic support operations, 1990-1991 [1991, eng] **A-48793**
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Agulhas Magsat anomaly: implications for continental break-up of Gondwana [1992, eng] **L-47487**
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Mineralogical studies of lunar meteorite Yamato-793169, a mare basalt [1993, eng] **E-48685**
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Prefabricated engineering services for use in antarctic regions: pipe lines in harsh environments [1992, eng] **G-47696**
- Arendt, J.**
Melatonin suppression in human subjects by bright and dim light in Antarctica: time and season-dependent effects [1992, eng] **H-47705**
- Argentina. Dirección Nacional del Antártico**
Antártida Argentina, Oct. 1992, No.18 [1992, spa] **A-49458**
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Interaction of gravity driven flows at Nansen Ice Sheet [1992, eng] **I-47399**
Statistical analysis of katabatic winds near Terra Nova Bay Station, 1987-1988 [1991, ita] **I-47687**
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- Armas Barea, C.A.** (*cont.*)
 Concepts of "Mankind's interest" and "Common property of mankind"
 [1992, spa] **M-48565**
- Arnaud, P.M.**
 Notes on the reproduction of high-antarctic molluscs from the Weddell Sea
 [1992, eng] **B-47466**
 Level of pollution of Kerguelen Islands biota by organochlorine compounds
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 Identification of a post-magnetic-noon source for Pc1-2 micropulsations
 [1991, eng] **K-48782**
- Arnoux, A.**
 Level of pollution of Kerguelen Islands biota by organochlorine compounds
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 Comparison of surface stress and precipitation fields in short-range forecasts
 over the antarctic region [1993, eng] **I-49049**
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 Influence of salinity and temperature covariation on the photophysical char-
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 High resolution study of the platelet ice ecosystem in McMurdo Sound,
 Antarctica: photosynthetic and bio-optical characteristics of a dense mi-
 croalgal bloom [1993, eng] **B-48960**
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 New technique to measure trace elements in individual aerosol particles
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 Physical oceanography of the Straits of Magellan [1991, eng] **J-49033**
 Physical oceanographic conditions in the southern Pacific Ocean and in the
 western Ross Sea [1992, eng] **J-49391**
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 Age of charnockitic gneiss from Mount Vechernyaya, Thala Hills, near
 Molodezhnaya Station, East Antarctica [1991, eng] **E-47570**
 Metamorphic evolution of the Sör Rondane Mountains, East Antarctica
 [1992, eng] **E-49235**
- Ashbolt, N.J.**
 Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast,
 continental Antarctica: microbial biomass distribution [1993, eng] **B-48204**
 Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast,
 continental Antarctica: some observations on methods for measuring soil
 biomass in ornithogenic soils [1993, eng] **B-48205**
 Biotechnology in the Antarctic—a unique source of microorganisms [1991,
 eng] **B-48509**
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 Method for preparing large numbers of otolith sections for viewing by scan-
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- Askin, R.A.**
 Eocene terrestrial palynology of Seymour Island [1991, eng] **E-45767**
 Eocene terrestrial palynology of Seymour Island [1991, eng] **E-47567**
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 Cartography and toponymy [1992, spa] **C-48594**
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 Differences in backscattering strength determined at 120 and 38 kHz for
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- Atre, S.R.**
 Analysis of seismic and gravity studies on the Siple Coast [1991, eng]
E-47994
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 Patterns in the benthic communities on the shelf of the subantarctic Prince
 Edward Islands [1993, eng] **B-48322**
- Australia. Antaretic Division**
 ANARE news, No.71/72 [1993, eng] **A-47958**
 ANARE news, No.73 [1993, eng] **A-49334**
 ANARE news, No.74 [1993, eng] **A-49335**
- Avdiushin, S.I.**
 Stratospheric ozone in the Arctic and Antarctic (Review) [1992, eng]
I-48426
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 Shallow water rissoiform gastropods from Tristan da Cunha, South Atlantic
 Ocean, with records of species from Gough Island [1993, eng] **B-49440**
- Azzali, M.**
 Distribution of krill biomass in the Ross Sea, December 89- January 90
 [1992, eng] **B-49402**
- Azzara, R.**
 Geomagnetic observation results 1986-1987 [1991, eng] **L-47672**
 Geomagnetic observation results 1987-1988 [1991, eng] **L-47675**
 Geomagnetic observation results 1988-1989 [1991, eng] **L-47677**
- Azzolini, R.**
 Physical oceanographic conditions in the southern Pacific Ocean and in the
 western Ross Sea [1992, eng] **J-49391**
- Babintsev, A.V.**
 Hydrology of Lake Glubokoye, King George I., winter 1987 [1991, rus]
E-47587
- Baei, G.**
 Mesoanalysis and operational weather forecast for the western Ross Sea
 [1992, eng] **I-47389**
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 International Biomedical Expedition to the Antarctic [1991, fre]
H-48296
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 Blood constituents and electrophoretic patterns in antarctic birds: penguins
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 Glacial/interglacial changes in sediment rain rate in the SW Indian sector
 of subantarctic waters as recorded by Th-230, Pa-231, U, and $\delta^{15}\text{N}$ [1993,
 eng] **J-49488**
- Bagriantsev, N.**
 Weddell Gyre warm-pool characteristics [1991, eng] **J-48358**
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 Variations of sea ice area and thickness in the southern ocean due to climate
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 Biogenic particles and nano/picoplankton in water masses over the Scotia-
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- Baldauf, J.G.**
 Middle Eocene through Early Miocene diatom floral turnover [1992, eng]
E-48289
- Baldi, M.**
 Part 1: surface wind field in the interior of the antarctic continent [1992,
 eng] **I-47390**
 Part 2: organized criticality of the surface atmospheric flow in the near-
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 Climatic atmospheric outflow at the rim of the antarctic continent [1992,
 eng] **I-47812**
- Balguerías, E.**
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 Glacier geophysical studies for an ice core site at "Taylor Dome" [1991,
 eng] **F-47998**
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 Simple visual technique for estimating the impact of fieldwork on the terres-
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 Properties and genesis of cryosols at Marble Point, McMurdo Sound region,
 Antarctica [1992, eng] **E-47652**
- Balmaeda, R.C.R.**
 Delimitation of Antarctica [1992, spa] **C-48593**
- Balsley, B.B.**
 Southern-Hemisphere PMSE: where are they [1993, eng] **K-49316**
- Balteas, N.**
 MICROSAT based communication system for rescue services and world-
 wide data transfer from the Antarctic [1993, eng] **A-48946**
- Bamber, J.L.**
 Analysis of infrared imagery over the Ronne Ice Shelf [1992, eng]
F-49077
 Results from a validation campaign for the ERS-1 radar altimeter on the
 Filchner-Ronne Ice Shelf, Antarctica [1992, eng] **F-49080**
- Bandel, K.**
 Limacosphaera, an unusual mesogastropod (Lamellariidae) larva of the Wed-
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- Bannasch, R.**
 Flipper bands on penguins: what is the cost of a life- long commitment
 [1993, eng] **B-49110**
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 Seismic investigation of the boundary between East and West Antarctica
 [1991, eng] **E-47564**
 Geophysical investigations of the tectonic boundary between East and West
 Antarctica [1993, eng] **E-48965**
- Barale, G.**
 First study of *in situ* fossil woods from the Upper Cretaceous of Livingston
 Island, South Shetland Islands, Antarctica: palaeoecological investiga-
 tions [1993, eng] **E-49441**

- Barange, M.**
Internal structure of antarctic krill *Euphausia superba* swarms based on acoustic observations [1993, eng] **B-49434**
- Barber, M.**
Theoretical and experimental results of using binders for snow roads and runways in Antarctica [1993, eng] **F-49324**
- Barboza, J.**
International responsibility in CRAMRA [1992, spa] **A-48580**
- Barbu, E.M.**
Proceedings of the Ocean Drilling Program, Vol.120. Scientific results. Part 1. Central Kerguelen Plateau [1992, eng] **E-47962**
- Bardin, V.I.**
Geochemical studies of loose Cenozoic sediments of East Antarctica [1992, rus] **E-48870**
- Bargagli, R.**
Antarctic moss turf as pollen traps [1991, eng] **B-47649**
Preliminary data on environmental distribution of mercury in northern Victoria Land, Antarctica [1993, eng] **B-47897**
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Sedimentary record of antarctic climate change [1992, eng] **I-48265**
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Observation of recurrent temperature lapse near the surface at the South Pole [1988, eng] **I-48553**
- Baroni, C.**
Geomorphological and glaciological research during the 2nd P.N.R.A. expedition to Terra Nova Bay, 1986-1987 [1991, ita] **E-47666**
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Eocene-Oligocene faunal turnover in planktic foraminifera, and antarctic glaciation [1992, eng] **E-48287**
- Barry, J.P.**
Distribution of the McMurdo Station sewage plume [1992, eng] **G-48678**
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Introduction [1992, eng] **F-48190**
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- Bartek, L.R.**
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Pliocene-Pleistocene seismic stratigraphy of the Ross Sea: evidence for multiple ice sheet grounding episodes [1992, eng] **E-48128**
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Cenozoic glacial history of the Ross Sea revealed by intermediate resolution seismic reflection data combined with drill site information [1992, eng] **J-47768**
- Barthel, D.**
Do hexactinellids structure antarctic sponge associations [1992, eng] **B-47422**
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Near breakup of the surface-flooded ice wharf at McMurdo Station, Antarctica [1992, eng] **G-47698**
- Bartsch, I.**
Antarctic Halacaroida (Acari): genera *Agaue*, *Bradyagaue*, and *Halacarellus* [1990, eng] **B-48406**
- Basch, L.V.**
Differences in feeding on algae and bacteria by temperate and antarctic sea star larvae [1991, eng] **B-47539**
- Bathmann, U.V.**
Antarctic marine primary production, biogeochemical carbon cycles and climatic change [1992, eng] **B-48268**
Winter distribution and overwintering strategies of the antarctic copepod species *Calanoides acutus*, *Rhincalanus gigas* and *Calanus propinquus* (Crustacea, Calanoida) in the Weddell Sea [1993, eng] **B-48917**
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Zooplankton distribution, biochemistry and genetics [1991, eng] **B-47634**
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Preliminary data on environmental distribution of mercury in northern Victoria Land, Antarctica [1993, eng] **B-47897**
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Diversity of micro-fungi in an antarctic dry valley [1991, eng] **B-48531**
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Clouds over both polar regions from the ISCCP pilot data sets [1988, eng] **I-48551**
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Pretectonic burial metamorphism in the Heritage Group, southern Ellsworth Mountains, West Antarctica [1992, eng] **E-48073**
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Brief report on geomagnetic profile measurements in the vicinity of the Schirmacher Hills, Wohlthat Mountains, Queen Maud Land [1992, ger] **L-47742**
- Baum, S.K.**
Milankovitch cycles and carboniferous climate [1993, eng] **I-49123**
Effect of decreased solar luminosity on Late Precambrian ice extent [1993, eng] **I-49253**
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Age relations of the high grade metamorphic rocks in the Terra Nova Bay area, north Victoria Land, Antarctica: a preliminary report [1992, eng] **E-47825**
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Relationships between temperature, population density, and growth in a seatrout population (*S. Trutta* L.) of the Kerguelen Islands [1992, eng] **B-47717**
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- Beaubien, D.J.**
Development and characterization of a new solar ultraviolet-B irradiance detector [1993, eng] **I-48458**
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Geophysical investigations of the tectonic boundary between East and West Antarctica [1993, eng] **E-48965**
Seismic investigations of the Earth's crust: velocity structure and tectonics, Yukon-Tanana Terrane, Alaska, and near surface effect on wave propagation, Ross Ice Shelf [1992, eng] **L-48523**
- Bech, C.**
Aspects of the breeding biology of the antarctic petrel *Thalassoica antarctica* and the krill requirement of the chicks, at Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land [1991, eng] **B-47881**
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United Nations and Antarctica, 1992: still searching for that elusive convergence of view [1993, eng] **M-49217**
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Interactions in the microbial community of the marginal ice zone of the northwestern Weddell Sea through size distribution analysis [1992, eng] **B-47455**
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Engineering-economic evaluation of offshore oil and gas development in the Ross Sea, Antarctica [1992, eng] **A-48811**
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Penguin chicks in their cold environment [1992, eng] **B-49159**
- Bekriaev, R.V.**
Effect of a meridional profile of surfaces on the characteristics of large-scale atmospheric waves [1992, rus] **I-48467**
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Atmospheric circulation of the Southern Hemisphere and geomagnetic activity [1991, rus] **I-47584**
Relationship between riometric absorption and meteorological factors [1991, rus] **K-47589**
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Meteorological research using a high mast on an antarctic ice shelf [1987, eng] **I-48160**

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Hydrological fronts of the southern ocean, summer 1988-1989 [1992, rus] **J-48875**
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Spectral comparison between olivine-rich asteroids and pallasites [1993, eng] **E-48698**
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- Benassi, G.**
Planktonic Ostracoda in the southern ocean and in the Ross Sea: 1989-90 campaign [1992, eng] **B-49400**
- Bendiksen, F.S.**
Norwegian Antarctic Research Expedition 1989-90—medical contingency, work and research [1991, nor] **H-47485**
- Benedetti, F.**
Phytoplankton distribution and environmental factors in Terra Nova Bay [1991, ita] **J-47661**
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Diving and haulout behavior of crabeater seals in the Weddell Sea, Antarctica, during March 1986 [1992, eng] **B-47624**
AMLR program: Antarctic fur seal foraging patterns at Seal Island, South Shetland Islands, Antarctica, during austral summer 1990-1991 [1991, eng] **B-47873**
AMLR program: Foraging areas of krill-consuming penguins and fur seals near Seal Island, Antarctica [1991, eng] **B-47874**
AMLR program: Reproductive performance of chinstrap penguins on Seal Island, South Shetland Islands, Antarctica [1991, eng] **B-47875**
Diving behaviour of chinstrap penguins at Seal Island [1993, eng] **B-47898**
- Benoit, P.H.**
Natural thermoluminescence of meteorites and paleo-ice movement at the Lewis Cliff blue ice field [1991, eng] **E-47989**
Natural thermoluminescence of meteorites. 5. Ordinary chondrites at the Allan Hills ice fields [1993, eng] **E-48019**
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Comparison of altimetry profiles over East Antarctica from Seasat and Geosat: an interim report [1990, eng] **F-48386**
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Vehicles and transports during the Swedish Antarctic Research Programme 1991/92 [1993, eng] **G-48940**
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Geology and chemistry of the Early Paleozoic dike-swarms in southern Victoria Land [1991, eng] **E-47563**
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Scavenging of Th-230 and Pa-231 near the Antarctic Polar Front in the South Atlantic [1993, eng] **J-48423**
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Eocene-Oligocene climatic and biotic evolution [1992, eng] **I-48284**
- Berguño B., J.**
South Shetland Islands: the sealing cycle. 2 [1993, spa] **A-49460**
South Shetland Islands: the sealing cycle. 1 [1993, spa] **A-49466**
- Bering, E.A., III**
Measurements of atmospheric conduction currents and electric fields at the South Pole [1991, eng] **K-48778**
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Scallop shell mineralogy and crystalline characteristics: proxy records for interpreting antarctic nearshore marine hydrochemical variability [1992, eng] **E-48125**
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AMLR program: Vertical distribution of krill in the vicinity of Elephant Island [1991, eng] **B-47870**
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Test morphogenesis and bioadhesives in a giant antarctic foraminifer [1991, eng] **B-47537**
Experimental and field evidence of antarctic foraminiferal tolerance to anoxia and hydrogen sulfide [1993, eng] **B-48173**
Structure, bioadhesive distribution and elastic properties of the agglutinated test of *Astrammmina rara* (Protozoa: Foraminiferida) [1993, eng] **B-48955**
- Bertolini, L.M.**
Monitoring the dynamics of the antarctic coastline with Landsat images [1991, eng] **F-48789**
- Besprozvannaia, A.S.**
Spatial-temporal distribution of ionization of the F2 layer at high latitudes of the northern and southern hemispheres during wintertime [1992, eng] **K-48758**
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South African research on antarctic whales [1991, eng] **B-48893**
- Bester, M.N.**
Ranging behaviour of southern elephant seal cows from Marion Island [1992, eng] **B-48244**
Marion Island cat programme [1991, eng] **B-48889**
South African research on antarctic seals [1991, eng] **B-48899**
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Numerical experiments on a possible mechanism of cyclogenesis over the circum-antarctic ocean [1992, eng] **I-47392**
Influence of air-sea heat exchanges on rapid cyclogenesis in the antarctic region: improved numerical experiments [1992, eng] **I-47794**
Numerical experiments on a possible mechanism of cyclogenesis in the antarctic region [1993, eng] **I-48132**
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Dinoflagellate cysts from surface sediments of the Bransfield Strait, Antarctica [1992, kor] **E-48164**
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OASI Observatory in Antarctica [1991, eng] **K-47727**
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Primary structure and functional features of hemoglobins from several species of antarctic teleosts [1991, eng] **B-47637**
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Properties and genesis of cryosols at Marble Point, McMurdo Sound region, Antarctica [1992, eng] **E-47652**
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Geomagnetic research in Terra Nova Bay area [1991, ita] **L-47668**
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Variations in mercury deposition to Antarctica over the past 34,000 years [1993, eng] **F-48347**
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Correlating the auroral activity with the southern high-latitude O₃-content [1992, eng] **I-47814**
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Cu, Zn and Cd content in different tissues of the antarctic scallop *Adamussium colbecki*: role of metallothionein in heavy metal homeostasis and detoxication [1993, eng] **B-48815**
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Geomagnetic measurements during the Italian Antarctic Expedition in 1986-1987 [1991, ita] **L-47667**
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Extraordinary levels of cadmium and zinc in a marine sponge, *Tedania charcoti* Topsent: inorganic chemical defense agents [1993, eng] **B-48912**
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Three-axial sonic anemometer-thermometer measurements in the Terra Nova Bay: some preliminary results [1992, eng] **I-47790**
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Effects of chronic exposure to the water soluble fraction of fuel oil on an antarctic fish *Pagothenia borchgrevinki* [1993, eng] **B-48474**
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PAHs in the atmospheric particulate in the area of the Italian scientific base in Antarctica [1993, eng] **I-49054**
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South-Pole: the Italian system for antarctic data exchange [1992, eng] **A-47401**
South Pole: a progress report on the Italian system for antarctic data exchange [1992, eng] **A-47802**
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Antarctic sea-ice relationships with indices of the atmospheric circulation of the Southern Hemisphere [1989, eng] **F-49495**
Synoptic aspects of antarctic mesocyclones [1993, eng] **I-49047**
Satellite climatology of 'polar lows' and broadscale climatic associations for the Southern Hemisphere [1990, eng] **I-49446**
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Contribution to the study of copepods collected during the Italian oceanographic campaign in Antarctica 1989-90 [1992, eng] **B-49397**

- Larval crustacean decapods collected during the Italian oceanographic campaign in Antarctica 1989-90 [1992, eng] **B-49398**
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Swedish Antarctic Research Programme 1991/92; a cruise report [1992, eng] **A-47601**
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Satellite climatology of 'polar lows' and broadscale climatic associations for the Southern Hemisphere [1990, eng] **I-49446**
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Spatial and temporal variations in the diet of nototheniid fish in McMurdo Sound, Antarctica [1993, eng] **B-49120**
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Katabatic surges across the Ross Ice Shelf, Antarctica: atmospheric circulation changes and oceanographic impacts [1992, eng] **I-47943**
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Tomographic inversion of the seismic reflection arrivals acquired at the Ross Sea (Antarctica) [1992, eng] **E-48794**
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Evidence from fossil vertebrates for a rich Eocene antarctic marine environment [1992, eng] **E-47762**
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Distribution of krill biomass in the Ross Sea, December 89- January 90 [1992, eng] **B-49402**
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Elastic backscattering lidar system for atmospheric measurements [1991, ita] **I-47682**
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Supply and storage of fuel in the Spanish antarctic base Juan Carlos I [1993, eng] **G-48931**
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Medical and health aspects of the Italian antarctic programme [1993, eng] **H-48927**
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Phytoplankton distribution and environmental factors in Terra Nova Bay [1991, ita] **J-47661**
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Response of antarctic climate in general circulation model experiments with transiently increasing carbon dioxide concentrations [1992, eng] **I-48259**
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- Centro Ricerca e Documentazione Polare, Rome**
Polar news/Notizie polari, Vol.7, No.6 [1992, ita] **A-47511**
Polar news/Notizie polari, Vol.7, No.10 [1992, ita] **A-47918**
Polar news/Notizie polari, Vol. 8, No.5 [1993, ita] **A-49274**
Polar news/Notizie polari, Vol. 7, No.11-12 [1992, ita] **A-49279**
Polar news/Notizie polari, Vol. 8, No.1 [1993, ita] **A-49280**
Polar news/Notizie polari, Vol. 8, No.2 [1993, ita] **A-49281**
Polar news/Notizie polari, Vol. 8, No.3 [1993, ita] **A-49282**
Polar news/Notizie polari, Vol. 8, No.4 [1993, ita] **A-49283**
Polar news/Notizie polari, Vol.8, No.7-8 [1993, ita] **A-49454**
Polar news/Notizie polari, Vol.8, No.6 [1993, ita] **A-49455**
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Keratinophilic fungi isolated from antarctic soil [1991, eng] **B-47644**
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Isotopic evidence for reduced productivity in the glacial southern ocean [1993, eng] **E-49185**
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MD 68/SUZIL expedition on board the *Marion Dufresne*, Apr. 12-May 20, 1991. Vol.1: Hydrology [1993, fre] **J-48468**
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Microzooplankton populations' temporal trend in Terra Nova Bay (austral summer 1989/90) [1992, eng] **B-49396**
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Three-dimensional perspective on cosmic-ray anisotropies [1991, eng] **K-48784**
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Physical model of bathymetric effects on the Antarctic Circumpolar Current [1993, eng] **J-48042**
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Modern information technology and modern antarctic research [1992, chi] **A-48121**
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Research on the benthic ecology environment, antarctic ocean: 1. Maxwell Bay and Admiralty Bay [1992, chi] **B-48118**
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Proceedings. Vol.2 [1992, eng] **F-47693**
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Southern ocean benthic fauna and climate change: a historical perspective [1992, eng] **B-48269**
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Interactive atmospheric surface-layer modifications for a large-scale sea-ice model [1992, eng] **F-47945**
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Analysis of antarctic data, Feb. 1987-Aug. 1990 [1992, eng] **I-47388**
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Perspectives of the atmospheric physics researches in Antarctica [1992, eng] **A-47386**
Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.34 [1992, eng] **I-47385**
Part 1: surface wind field in the interior of the antarctic continent [1992, eng] **I-47390**
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Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.35 [1992, eng] **I-47785**
Climatic atmospheric outflow at the rim of the antarctic continent [1992, eng] **I-47812**
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Glacial climates in the antarctic region during the Late Paleogene: evidence from northwest Tasmania, Australia [1993, eng] **I-47931**
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- Colwell, R.R.**
Direct sequencing of the polymerase chain reaction-amplified 16S rRNA gene of *Flavobacterium gondwanense* sp. nov. and *Flavobacterium salegens* sp. nov., two new species from a hypersaline antarctic lake [1993, eng] **B-48034**
- Colwell, S.J.**
Nutritional flexibility in yolk-rich planktotrophic larvae of an antarctic echinoderm [1991, eng] **B-47538**
- Comerci, S.M.**
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Coastal zone color scanner pigment concentrations in the southern ocean and relationships to geophysical surface features [1993, eng] **J-48041**
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Weathering of basaltic rocks under cold arid conditions: Antarctica and Mars [1991, eng] **E-48766**
- Conference on Polar Meteorology and Oceanography, 2nd, Madison, WI, Mar. 29-31, 1988**
Preprints [1988, eng] **I-48546**
- Conference on Polar Meteorology and Oceanography, 3rd, Portland, OR, Sep. 29-Oct. 2, 1992**
Preprints [1992, eng] **I-47940**
- Connolley, W.M.**
Atmospheric water-vapour transport to Antarctica inferred from radiosonde data [1993, eng] **I-48090**
Global climate models and Antarctica [1992, eng] **I-49207**
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Seasonal lipid contents of antarctic micro-arthropods [1992, eng] **B-48307**
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- Cooper, A.P.R.**
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History of South African involvement in Antarctica and at the Prince Edward Islands [1991, eng] **A-48884**
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- Dobson, S.J.**
Cell wall-less, free-living spirochetes in Antarctica [1992, eng] **B-47486**
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- Donachie, S.P.**
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- Dong, Z.Q.**
National report on China's scientific research in the southern ocean relevant to the BIOMASS Program [1992, eng] **B-49141**
- Donnelly, J.**
Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988) [1993, eng] **B-48391**
- Dorn, R.I.**
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Operating philosophy for the U.S. Antarctic Program [1992, eng] **B-48665**
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Heterogeneous chemistry on antarctic polar stratospheric clouds: a microphysical estimate of the extent of chemical processing [1993, eng] **I-48623**
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Radioelement distribution in the sedimentary sequence of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48072**
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- Drits, A.V.**
Feeding, metabolism and body composition of the antarctic copepod *Calanus propinquus* Brady with special reference to its life cycle [1993, eng] **B-48321**
- Du, Y.**
Numerical simulation of katabatic winds crossing the Siple Coast area of West Antarctica [1992, eng] **I-47956**
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- Duchamp, C.**
Nonshivering thermogenesis in king penguin chicks. I. Role of skeletal muscle [1991, eng] **B-47747**
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- Dudziak, J.**
Nannoplankton evidence for Tertiary sedimentary basement of the Deception Island volcano, West Antarctica [1991, eng] **E-47912**
- Duhamel, G.**
Careproctus and *Paraliparis* n.sp., and *Edentoliparis*, from the southern ocean (Cyclopteridae, Liparinae) [1992, fre] **B-47572**
Reproduction in fish of the Weddell Sea [1993, eng] **B-48333**
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Fish species distribution, abundance and biology in Kerguelen waters, 1987-1988 [1993, fre] **B-48492**
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SKALP expeditions 1987-1988 to Kerguelen Is. on board the ships *Skif* and *Kalper* [1993, fre] **J-48479**
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Transantarctica: traversing the last continent [1990, fre] **A-47629**
- Dunbar, R.B.**
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Circulation in eastern McMurdo Sound, Antarctica, January through November 1990 [1991, eng] **J-48363**
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- Dunn, R.C.**
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Netherlands Antarctic Programme (NAAP) 1994-2000 [1992, eng] **A-49172**
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Helioseismology from South Pole: 1990 high-resolution campaign [1991, eng] **K-48775**
- Dyment, J.**
Evolution of the Indian Ocean Triple Junction between 65 and 49 Ma (Anomalies 28 to 21) [1993, eng] **E-48968**
- E, M.L.**
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Chilean contributions to the BIOMASS Program [1992, eng] **B-49140**
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Distribution of REEs in HCL/HNO₃-residues of antarctic UOCs and its implications to their metamorphic genesis on UOC parent bodies [1992, eng] **E-49313**
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Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data [1993, eng] **F-48650**
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Some aspects of the interaction between chemical and dynamic processes relating to the antarctic ozone hole [1993, eng] **I-47711**
- Economist**
Looking beyond the end of the earth [1992, eng] **A-48029**
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Physical variation of water vapor, and the relation with carbon dioxide [1992, eng] **I-47377**
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Internal atmospheric gravity waves near the coast of Antarctica [1993, eng] **I-49318**
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Highly potassic basaltoids of the Manning Massif [1992, rus] **E-48868**
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Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica [1993, eng] **E-48433**
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Drill hole and ice-core studies of sea-ice thickness distributions in the Arctic and Antarctic [1992, eng] **F-48299**
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Textural characteristics of the core B13 from the Ronne Ice Shelf and the textural evolution of deforming ice [1992, eng] **F-49068**
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- Ekelund, N.G.A.**
Studies on the effects of UV-B radiation on phytoplankton of subantarctic lakes and ponds [1992, eng] **B-47501**
- El Goresy, A.**
Ca-,Al-rich inclusions in the unique chondrite ALH85085: petrology, chemistry, and isotopic compositions [1993, eng] **E-48805**
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Phytoplankton [1993, eng] **B-48742**
Reports of the national contributions to the BIOMASS program [1992, eng] **B-49135**
- Elkins, J.W.**
Decrease in the growth rates of atmospheric chlorofluorocarbons 11 and 12 [1993, eng] **I-48957**
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Potassium-argon dating of fine-grained basalts with massive Ar loss: application of the Ar-40/Ar-39 technique to plagioclase and glass from the Kirkpatrick Basalt, Antarctica [1993, eng] **E-48861**
- Elliott, S.**
Heterogeneous chemistry on antarctic polar stratospheric clouds: a microphysical estimate of the extent of chemical processing [1993, eng] **I-48623**
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Surface ozone concentration at the Molodezhnaya and Mirnyy antarctic stations based on measurements conducted in Spring 1987 through Fall 1988 [1992, eng] **I-48105**
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Use of an automated weighing and recording system for the study of the biology of Adélie penguins (*Pygoscelis adeliae*) [1993, eng] **B-48604**
Foraging range of Adélie penguins at Béchervaise Island, Mac. Robertson Land, Antarctica, and its overlap with the krill fishery [1993, eng] **B-49382**
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Antarctica: the construction of a continent by and for science [1993, eng] **A-48159**
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On antarctic entoprocta: Nematocyst-like organs in a Loxosomatid, adaptive developmental strategies, host specificity, and bipolar occurrence of species [1993, eng] **B-48719**
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Identification of a post-magnetic-noon source for Pc1-2 micropulsations [1991, eng] **K-48782**
Comparison of ultra-low-frequency fluctuations in magnetic field and very-low-frequency emissions at three antarctic stations [1991, eng] **K-48783**
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Mechanism for Antarctic Intermediate Water renewal in a world ocean model [1993, eng] **B-49271**
Representing the global-scale water masses in ocean general circulation models [1993, eng] **J-49270**
- Engler, M.**
Methodology for full-scale iceberg impact experiments in the Antarctic [1992, eng] **F-47700**
Construction of the Dumont d'Urville airfield [1990, fre] **G-48282**

- Enomoto, H.**
Interannual fluctuations of sea ice extent in the Antarctic and associated atmospheric conditions [1992, eng] **F-48188**
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Antarctic tourism and environmental concerns [1992, eng] **A-48668**
Antarctic tourism: 1991/92 season activity [1993, eng] **A-48734**
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Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**
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Assessing indirect effects of oil in the presence of natural variation: The problem of reproductive failure in south polar skuas during the *Bahia Paraiso* oil spill [1992, eng] **B-48675**
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Observations on life cycles and feeding ecology of two recently introduced predatory beetle species at South Georgia, sub-antarctic [1993, eng] **B-49119**
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Annual cycles of phytoplankton chlorophyll concentrations in the global ocean: a satellite view [1993, eng] **J-48349**
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Ecology of *Metridia gerlachei* in the western Bransfield Strait, Antarctica [1992, eng] **B-48505**
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Respiratory electron transport activity of microplankton in the Weddell Sea during early spring: influence of the ice cover and the ice edge [1992, eng] **B-47463**
- Estrany y Gendre, A.**
Onshore and offshore mining operations and economic prospects [1992, spa] **A-48583**
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Transantarctica: traversing the last continent [1990, fre] **A-47629**
- Eugster, O.**
Pu-244-Xe formation and gas retention age, exposure history, and terrestrial ages of angrites LEW86010 and LEW87051: comparison with Angra dos Reis [1991, eng] **E-47380**
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O₃ and NO₂ absorption cross section measurements by multipath spectrophotometer [1992, eng] **I-47403**
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Terrestrial ages of Victoria Land meteorites derived from cosmic-ray-produced radionuclides [1992, eng] **E-48143**
- Evans, K.R.**
Sea-level fluctuations and the evolution of a Middle Cambrian carbonate ramp in the Neptune Range [1991, eng] **E-47569**
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International sharing of polar information resources [1992, eng] **A-47515**
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Managing southern ocean krill and fish stocks in a changing environment [1992, eng] **B-48270**
Comparison of krill (*Euphausia superba*) density estimates using 38 and 120 kHz echosounders [1993, eng] **B-48797**
Aggregation patterns of pelagic predators and their principal prey, antarctic krill, near South Georgia [1993, eng] **B-48952**
Interpretation of acoustic data at two frequencies to discriminate between antarctic krill (*Euphausia superba* Dana) and other scatterers [1993, eng] **B-49000**
- Expéditions polaires françaises. Missions Paul-Emile Victor**
Information bulletin No.24, June 1990 [1990, fre] **A-48273**
Information bulletin No.25, Aug. 1991 [1991, fre] **A-48290**
- Fabiano, M.**
Biochemical composition of particulate organic matter in the Straits of Magellan [1991, eng] **B-49037**
Italian Antarctic Expedition 1989-90: preliminary observations on particulate organic matter [1990, eng] **J-49202**
Particulate organic carbon, nitrogen and nucleic acids (DNA, RNA) in antarctic waters (Ross Sea and Terra Nova Bay) [1992, eng] **J-49393**
- Faccini, E.E.**
Antarctic drifting sea ice atlas for areas restricted from 0 to 90 west longitude [1993, eng] **C-48944**
- Fahl, K.**
Lipid content and fatty acid composition of algal communities in sea-ice and water from the Weddell Sea (Antarctica) [1993, eng] **B-49116**
- Fahrbach, E.**
Antarctic Coastal Current in the southeastern Weddell Sea [1992, eng] **J-47450**
Circulation and water mass modification in the Weddell Sea [1992, eng] **J-49065**
Circulation and water mass formation in the Weddell Sea [1993, ger] **J-49180**
- Fan, Z.G.**
Preliminary studies of acoustic behaviour and sound signals of *Sterna vittata*, Antarctica [1993, chi] **B-48773**
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Numerical experiments on a possible mechanism of cyclogenesis over the circum-antarctic ocean [1992, eng] **I-47392**
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Numerical experiments on a possible mechanism of cyclogenesis in the antarctic region [1993, eng] **I-48132**
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Nitrogen uptake in the Weddell Sea during late winter and spring [1992, eng] **J-47459**
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Planetary-scale disturbances in the southern stratosphere during early winter [1992, eng] **I-47959**
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Oxygen isotope study of the ice fields surrounding the Reckling Moraine on the East Antarctic ice sheet [1992, eng] **F-48124**
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Observing seals by satellite [1993, eng] **B-49486**
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Geological structure of the Fisher massif, eastern Antarctica [1992, eng] **E-48040**
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Interannual variations of krill larvae abundance in the Scotia Sea [1992, rus] **B-48880**
Winter distribution of Euphausiid larvae in the convergence zone of the Antarctic Circumpolar Current and Weddell Sea waters [1992, eng] **B-49355**
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Annual cycles of phytoplankton chlorophyll concentrations in the global ocean: a satellite view [1993, eng] **J-48349**
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Late Cretaceous and Paleocene decapod crustaceans from James Ross Basin, Antarctic Peninsula [1993, eng] **E-48239**
Genus *Lyreidus* de Haan, 1839 (Crustacea, Decapodoa, Raninidae): systematics and biogeography [1992, eng] **E-48477**
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Contribution to the study of copepods collected during the Italian oceanographic campaign in Antarctica 1989-90 [1992, eng] **B-49397**
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Resolving the enigma of cold enzymes [1990, fre] **B-48280**
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Field relations of Granite Harbour intrusives and associated dikes from the USARP Mountains, north Victoria Land, and Prince Albert Mountains, central Victoria Land, Antarctica [1992, eng] **E-47827**
Gradational east-west increase in metamorphism in the basement rocks of the Helliwell Hills, Wilson Terrane, north Victoria Land, Antarctica [1992, eng] **E-47829**
New field data from Surgeon Island, north Victoria Land, Antarctica [1992, eng] **E-47833**
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Auroral observations in the Antarctic at the time of the Tunguska event, 1908 June 30 [1993, eng] **K-49264**
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Monitoring the dynamics of the antarctic coastline with Landsat images [1991, eng] **F-48789**
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Antarctic glacier-tongue velocities from Landsat images: first results [1993, eng] **F-49429**

- Fetterer, F.M.**
Sea ice altimetry [1992, eng] **F-48192**
Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**
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Numerical experiments of convection-diffusion dominated flow problems and open boundary conditions in finite difference models [1990, eng] **J-49191**
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Measurements of atmospheric conduction currents and electric fields at the South Pole [1991, eng] **K-48778**
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Variability and interactions of phytoplankton and bacterioplankton in the antarctic neritic area [1992, eng] **B-47913**
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Snow grain-size determination from Landsat imagery over Terre Adélie, Antarctica [1993, eng] **F-49410**
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Chlorine, fluorine, and sulfur emissions from Mount Erebus, Antarctica and estimated contributions to the antarctic atmosphere [1993, eng] **E-49315**
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Temperature effects and fatty acid patterns in *Geomyces* species isolated from antarctic soil [1993, eng] **B-48255**
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South Pole lidar: brief description of the instrument [1991, eng] **I-47684**
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Glacier geophysical studies for an ice core site at "Taylor Dome" [1991, eng] **F-47998**
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Stable carbon isotope composition, depth distribution and fate of macroalgae from the Antarctic Peninsula region [1992, eng] **B-47470**
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Planetary-scale disturbances in the southern stratosphere during early winter [1992, eng] **I-47959**
Rapid descent of mesospheric air into the stratospheric polar vortex [1993, eng] **I-49129**
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Chemistry of Quaternary volcanism in the Bransfield Strait and South Shetland Islands: preliminary results [1991, eng] **E-48369**
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Synoptic aspects of antarctic mesocyclones [1993, eng] **I-49047**
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Variations in mercury deposition to Antarctica over the past 34,000 years [1993, eng] **F-48347**
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Evidence for Early Holocene deglaciation of the Vestfold Hills, East Antarctica [1993, eng] **E-48733**
Glacial climates in the antarctic region during the late Pliocene: evidence from northwest Tasmania: comment and reply [1993, eng] **I-49361**
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Anthropogenic lead in antarctic sea water [1993, eng] **J-49092**
- Fleming, T.H.**
Mesozoic volcanic rocks in the Queen Alexandra Range [1991, eng] **E-47549**
Potassium-argon dating of fine-grained basalts with massive Ar loss: application of the Ar-40/Ar-39 technique to plagioclase and glass from the Kirkpatrick Basalt, Antarctica [1993, eng] **E-48861**
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Lidar depolarization by nonspherical particles [1992, eng] **I-47408**
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Tracking of the humpback whale [1993, spa] **B-49465**
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Structural continuity of the Ross and Delamerian orogens of Antarctica and Australia along the margin of the paleo-Pacific [1993, eng] **E-48247**
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Compositions and mineralogies of unmelted polar micrometeorites: similarities and differences with IDPs and meteorites [1993, eng] **E-48702**
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On two antarctic Collembola *Gressittacantha terranova* and *Friesea grisea* [1991, eng] **B-47632**
Antarctic moss turf as pollen traps [1991, eng] **B-47649**
Preliminary data on environmental distribution of mercury in northern Victoria Land, Antarctica [1993, eng] **B-47897**
Mixed function oxidase activity and chlorinated hydrocarbon residues in antarctic sea birds: south polar skua (*Catharacta maccormicki*) and Adélie penguin (*Pygoscelis adeliae*) [1992, eng] **B-48054**
Entrapment of long-distance transported pollen grains by various moss species in coastal Victoria Land, Antarctica [1993, eng] **B-48250**
Induction of mixed function oxidase (MFO) system in two species of antarctic fish from Terra Nova Bay (Ross Sea) [1992, eng] **B-49213**
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History of antarctic science [1992, eng] **A-48851**
- Foland, K.A.**
Potassium-argon dating of fine-grained basalts with massive Ar loss: application of the Ar-40/Ar-39 technique to plagioclase and glass from the Kirkpatrick Basalt, Antarctica [1993, eng] **E-48861**
- Folsom, S.D.**
Otolith structural and chemical analyses: the key to resolving age and growth of the antarctic silverfish, *Pleuragramma antarcticum* [1993, eng] **B-47903**
- Fonda Umani, S.**
Microzooplankton populations' temporal trend in Terra Nova Bay (austral summer 1989/90) [1992, eng] **B-49396**
- Fontana, L.R.**
Proceedings of the Fifth Symposium on Antarctic Logistics and Operations, San Carlos de Bariloche, Argentina, 8 to 10 June 1992 [1993, eng] **G-48921**
- Foote, K.G.**
Status of krill target strength [1993, eng] **B-49369**
- Foreman, D.W.**
Scallop shell mineralogy and crystalline characteristics: proxy records for interpreting antarctic nearshore marine hydrochemical variability [1992, eng] **E-48125**
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Annual ablation rates of the Lewis Cliff ice tongue [1991, eng] **F-48004**
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Preliminary data on environmental distribution of mercury in northern Victoria Land, Antarctica [1993, eng] **B-47897**
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Differences in temperature and conductivity between the east and west lobes of Lake Bonney: evidence for circulation within and between lobes [1991, eng] **E-47876**
- Fortuin, J.P.F.**
Atmospheric model for simulating the mass balance and temperature on the antarctic ice sheet [1990, eng] **I-48388**
- Foster, B.A.**
Planktivory in benthic nototheniid fish in McMurdo Sound, Antarctica [1993, eng] **B-48757**
Spatial and temporal variations in the diet of nototheniid fish in McMurdo Sound, Antarctica [1993, eng] **B-49120**
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Antarctic bottom water formation in the northwestern Weddell Sea [1991, eng] **J-48356**
Convection studies [1993, eng] **J-49089**
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Critical review of magnetotelluric studies in diverse tectonic areas in Argentina, Chile and Antarctica [1992, eng] **L-48717**
- Fox, A.**
Customised digital maps of Antarctica [1993, eng] **C-49485**

- Fox, L.E.**
Vapor pressures of solid hydrates of nitric acid: implications for polar stratospheric clouds [1993, eng] **I-47510**
- Fraga, J.A.**
Strategic position of Antarctica under the Antarctic Treaty System [1992, spa] **M-48590**
- Franchi, I.**
Meteorite finds by EUROMET near Frontier Mountain, north Victoria Land, Antarctica [1993, eng] **E-48400**
- Francis, A.**
Safety in the operation of cryogenic systems at the South Pole [1993, eng] **G-49430**
- Francis, J.E.**
Cretaceous fossil wood from the Raggatt Basin, southern Kerguelen Plateau (Site 750) [1992, eng] **E-47980**
Potential for Cretaceous coal in Antarctica [1992, eng] **E-49223**
- Francke, H.W.**
Ecology of lichens in the coastal regions of the Argentine Islands, Antarctic Peninsula—a preliminary report [1991, eng] **B-48971**
- Francke, J.W.**
Ecology of macrolichens in antarctic coastal areas [1992, eng] **B-49166**
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Glacial to interglacial changes in surface nitrate utilization in the Indian Sector of the southern ocean as recorded by sediment *deltaN-15* [1992, eng] **J-49436**
Glacial/interglacial changes in sediment rain rate in the SW Indian sector of subantarctic waters as recorded by Th-230, Pa-231, U, and *deltaN-15* [1993, eng] **J-49488**
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Solar ultraviolet irradiance observed from southern Argentina: September 1990 to March 1991 [1993, eng] **I-48646**
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Introduced populations of *Dendrodrilus rubidus* ssp. (Oligochaeta:Lumbricidae) at Crozet, Kerguelen and Amsterdam Islands: effects of temperature on growth patterns during the juvenile stages [1992, eng] **B-48256**
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- Friedel, R.H.W.**
OMSKI for SANAE [1991, eng] **K-48903**
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Wind forcing and ice motion in the Weddell Sea region [1992, eng] **F-47774**
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Lithology and paleoclimatic implications of lacustrine deposits around Lake Vanda and Don Juan Pond, Antarctica [1993, eng] **E-48639**
- Friedmann, E.I.**
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Pa-231/Th-230 ratios in sediments as a proxy for past changes in southern ocean productivity [1993, eng] **J-48030**
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Melting of ice shelves and the mass balance of Antarctica [1992, eng] **F-47514**
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Phytoplankton in the Weddell Sea, Antarctica: composition, abundance and distribution in water-column assemblages of the marginal ice-edge zone during austral autumn [1993, eng] **B-48799**
- Fu, Y.L.**
Ar-40/Ar-39 isotopic dating of the syenogranite and granite pegmatite in the Zhongshan Station, East Antarctica [1992, chi] **E-47427**
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South Pole lidar: brief description of the instrument [1991, eng] **I-47684**
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Age and petrogenesis of the Sarmiento ophiolite complex of southern Chile [1992, eng] **E-48112**
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Data transfer system using a multi-ID ARGOS transmitter for the antarctic Polar Patrol Balloon experiment [1992, jpn] **I-48310**
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- Fujii, Y.**
Activities of the wintering party at Syowa Station by the 32nd Japanese Antarctic Research Expedition in 1991 [1992, jpn] **A-48316**
- Fujimaki, H.**
Rb-Sr age of an impact event recorded in Yamato-791088 H chondrite [1993, eng] **E-48704**
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Relation between ice sheet internal radio-echo reflections and ice fabric at Mizuho Station, Antarctica [1993, eng] **F-49422**

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Kr-81 terrestrial ages and grouping of Yamato eucrites based on noble gas and chemical compositions [1993, eng] **E-48453**
- Fukuchi, M.**
33rd Japanese Antarctic Research Expedition in 1991-93 [1992, jpn] **A-48414**
Report on Japan-Australia collaborative research on marine biology in the Prydz Bay area, Antarctica in 1992 [1993, jpn] **B-48621**
- Fukuda, Y.**
Determination of the gravity field around Antarctica using satellite altimeter data and surface gravity data—A review of the recent studies [1992, eng] **L-49245**
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Reexamination of the fractionation of total dissolved phosphorus in seawater using a modified UV-irradiation procedure, and its application to samples from Suruga Bay and antarctic ocean [1992, eng] **J-48385**
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Temperature dependence of coercivity for chondrites: Allende, Allan Hills-769 and Nuevo Mercurio [1993, eng] **E-48707**
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Benthic algal flora of Terra Nova Bay (Ross Sea, Antarctica) [1992, eng] **B-49319**
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Temporal and spatial variation in mercury concentrations in some albatrosses and petrels from the subantarctic [1993, eng] **B-48630**
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- Gahagan, L.M.**
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Turbulence in the antarctic middle atmosphere [1992, rus] **I-48863**
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Macrofaunal communities on the continental shelf and slope of the south-eastern Weddell Sea, Antarctica [1992, eng] **B-47464**
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- Galloway, D.J.**
Austral lichen genera: some biogeographical problems [1987, eng] **B-47495**
- Gambéroni, L.**
MD 68/SUZIL expedition on board the *Marion Dufresne*, Apr. 12-May 20, 1991. Vol.1: Hydrology [1993, fre] **J-48468**
- Gamô, S.**
On some serolid isopod crustaceans (Flabellifera) collected by the Japanese Antarctic Research Expedition from the antarctic sea [1991, jpn] **B-49193**
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Digital mapping produced with satellite image of Zhongshan Station area in Antarctica [1993, chi] **C-48774**
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- Garcia-Gómez, J.C.**
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- García Monge, M.**
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- Gillet, P.**
Biogeography and polychaete assemblages from subantarctic islands (Indian ocean): Marion Dufresne MD/08 benthos expedition to Marion, Prince Edward and Crozet Islands [1991, eng] **B-47784**
- Gillette, D.A.**
Are changes in dust sedimentation to polar regions a sign of dust production due to a climatic sensitive variable or more efficient atmospheric transport? And where does the dust come from [1991, eng] **I-47893**
- Gillingham, P.**
Proposal for an International Antarctic Observatory [1992, eng] **K-47778**
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Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.34 [1992, eng] **I-47385**
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Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.35 [1992, eng] **I-47785**
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Medical and health aspects of the Italian antarctic programme [1993, eng] **H-48927**
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Physiological responses of a small antarctic diatom (*Chaetoceros* sp.) to simulated environmental constraints associated with sea-ice formation [1992, eng] **B-47716**
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- Glenister, B.**
Devonian fossils from the Ellsworth Mountains, West Antarctica [1992, eng] **E-48069**
- Glenister, L.**
Cambrian conodonts from the Springer Peak and Minaret Formations, Ellsworth Mountains, West Antarctica [1992, eng] **E-48066**
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Arctic and antarctic sea ice, 1978-1987: satellite passive- microwave observations and analysis [1993, eng] **F-49385**
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- Gobbi, G.P.**
Evidence for denitrification in the 1990 antarctic spring stratosphere: 1. Lidar and temperature measurements [1991, eng] **I-47732**
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1991 spring lidar campaign for polar stratospheric clouds studies at McMurdo, Antarctica: preliminary results [1992, eng] **I-47809**
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- Godfrey, J.S.**
Mechanism for Antarctic Intermediate Water renewal in a world ocean model [1993, eng] **B-49271**
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Krill migration at the ice edge zone (December 1988-January 1989) [1991, eng] **B-48235**
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AMLR program: Antarctic fur seal foraging patterns at Seal Island, South Shetland Islands, Antarctica, during austral summer 1990-1991 [1991, eng] **B-47873**
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- Goffart, A.**
Zooplankton distribution, biochemistry and genetics [1991, eng] **B-47634**
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- Golden, D.M.**
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- Goldsworthy, S.**
Feeding ecology of southern fur seals (*Arctocephalus* spp.) and their management at Heard and Macquarie Islands. (Extended abstract) [1993, eng] **B-48613**
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Chromosomes of the antarctic amphipod *Waldeckia obesa* Chevreux [1993, eng] **B-49153**
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Concise review of antarctic fish research in South Africa [1991, eng] **A-48891**
- Gonda, T.**
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- Gonzalez, B.**
Homogeneity of Adélie penguins as krill samplers [1993, eng] **B-49377**
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Distribution and abundance of minipellets around the Antarctic Peninsula. Implications for protistan feeding behaviour [1992, eng] **J-48051**
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Geologic relations of the upper Nimrod Glacier region, central Transantarctic Mountains: evidence for multiple orogenic history [1991, eng] **E-47550**
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Holocene deglaciation, sea-level change, and the emergence of the Windmill Islands, Budd Coast, Antarctica [1993, eng] **E-49272**
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- Gordon, A.L.**
Weddell Gyre warm-pool characteristics [1991, eng] **J-48358**
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Magnitude and geographic variation of the radiocarbon content in antarctic marine life: implications for reservoir corrections in radiocarbon dating [1992, eng] **B-48335**
- Gordon, L.I.**
Mixed-layer nutrient contributions in the Weddell Gyre: winter 1989 and late austral spring 1990 [1991, eng] **B-48357**
- Görlach, U.**
Occurrence of heavy metals in antarctic and Greenland ancient ice and recent snow [1990, eng] **F-47780**
- Gormly, P.**
ANARE first aid manual (5th ed.) [1992, eng] **H-47419**
- Goss, C.**
Comparison of krill (*Euphausia superba*) density estimates using 38 and 120 kHz echosounders [1993, eng] **B-48797**
- Goulet, D.**
47W Transect: oceanography, suspended matter, and distribution of silicate and ammonium [1991, eng] **J-47662**
- Gouretski, V.V.**
Weddell Gyre: structure of the eastern boundary [1993, eng] **J-48447**
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Physical properties of sea ice relevant to remote sensing [1992, eng] **F-48191**
Particle transport to the snow surface at the South Pole: the beginning of a tropospheric history [1993, eng] **F-48383**

- Gowing, M.M.**
Winter plankton assemblage in the ice edge zone of the Weddell and Scotia Seas: composition, biomass and spatial distributions [1993, eng] **B-48422**
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- Gradinger, R.**
Life cycle of *Stephos longipes*--an example of cryopelagic coupling in the Weddell Sea (Antarctica) [1993, eng] **B-49111**
- Graf, W.**
Origin of green icebergs in Antarctica [1992, eng] **F-47939**
Isotopic and chemical investigations of 10 m firn cores from the eastern part of the Ronne Ice Shelf, Antarctica. (Extended summary) [1991, eng] **F-48992**
Textural characteristics of the core B13 from the Ronne Ice Shelf and the textural evolution of deforming ice [1992, eng] **F-49068**
- Gragnani, R.**
Major, minor and trace element distributions in surface water in Terra Nova Bay, Antarctica [1992, eng] **J-48154**
- Granberg, H.B.**
Observations of sea ice ridging in the Weddell Sea [1993, eng] **F-49297**
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Influence of copepod and krill grazing on the species composition of phytoplankton communities from the Scotia-Weddell Sea [1993, eng] **B-48334**
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Impact of heterogeneous chemistry on model predictions of ozone changes [1992, eng] **I-47575**
- Grantham, G.H.**
Geology and petrogenesis of the Straumsvola nepheline syenite complex, Dronning Maud Land, Antarctica [1993, eng] **E-48816**
- Gras, J.L.**
Condensation nucleus size distribution at Mawson, Antarctica: seasonal cycle [1993, eng] **I-49059**
Condensation nucleus size distribution at Mawson, Antarctica: microphysics and chemistry [1993, eng] **I-49060**
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Modeled latitudinal distribution of the ozone quasi-biennial oscillation using observed equatorial winds [1993, eng] **I-49450**
- Great Britain. Antarctic Place-names Committee**
Gazetteer of the British Antarctic Territory; second edition [1993, eng] **A-48818**
- Green, G.**
Hydrocarbon and coprostanol levels in seawater, sea-ice algae and sediments near Davis Station in eastern Antarctica: a regional survey and preliminary results for a field fuel spill experiment [1992, eng] **J-48673**
- Green, J.D.**
Invertebrates associated with moss communities at Canada Glacier, southern Victoria Land, Antarctica [1993, eng] **B-48329**
- Green, K.**
Consumption of marine resources by seabirds and seals at Heard Island and the McDonald Islands [1992, eng] **B-47626**
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- Green, T.G.A.**
History of Granite House and the western geological party of Scott's *Terra Nova* expedition [1993, eng] **A-48730**
Terrestrial vegetation at Canada Glacier, southern Victoria Land, Antarctica [1992, eng] **B-47475**
Invertebrates associated with moss communities at Canada Glacier, southern Victoria Land, Antarctica [1993, eng] **B-48329**
- Green, T.H.**
Petrology and geochemistry of basaltic rocks from the Balleny Is., Antarctica [1992, eng] **E-48499**
- Green, W.J.**
Trace metals in Vanda Lake in Antarctica [1992, eng] **E-47856**
Vertical migration of chromium in Vanda saline lake of Wright Valley, Antarctica [1992, chi] **E-48149**
Metal transport and release processes in Lake Vanda: the role of oxide phases [1993, eng] **E-48643**
- Greenfield, L.G.**
Nitrogen analyses of New Zealand and antarctic lichens [1992, eng] **B-47437**
Decomposition studies on New Zealand and antarctic lichens [1993, eng] **B-48197**
Known, new and probable snow petrel breeding locations in the Ross Dependency and Marie Byrd Land [1992, eng] **B-49268**
- Gregori, G.P.**
Underground record of global climate change [1992, eng] **I-47801**
MHD pulsed generators in Antarctica—man-made production of magnetospheric substorms, and underground surveying: proposals and perspectives [1992, eng] **K-47414**
Magnetospheric diagnostics by means of observations of polar auroras in Antarctica (electric field and plasma drift in the magnetosphere and in the polar ionosphere). Extended abstract [1992, eng] **K-47415**
“Calorimetric” vs. “instant” phenomena: a proposal for ionospheric research in Antarctica [1992, eng] **K-47417**
- Greischar, L.L.**
Analysis of gravity measurements on the Ross Ice Shelf, Antarctica [1992, eng] **F-48129**
- Gremmen, N.J.M.**
Ecology of lichens in the coastal regions of the Argentine Islands, Antarctic Peninsula—a preliminary report [1991, eng] **B-48971**
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- Grenfell, T.C.**
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Absorption of solar radiation at the antarctic snow surface [1988, eng] **F-48555**
- Grew, E.S.**
Age of charnockitic gneiss from Mount Vechernyaya, Thala Hills, near Molodezhnaya Station, East Antarctica [1991, eng] **E-47570**
- Grigioni, P.**
Mesoscale meteorology at Terra Nova Bay Station: operational aspects and some climatological results [1992, eng] **I-47387**
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- Grobe, H.**
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Late Quaternary climatic cycles as recorded in sediments from the antarctic continental margin [1992, eng] **E-47772**
Late Quaternary record of sea-level changes in the Antarctic [1993, eng] **J-49292**
- Groenewald, P.B.**
Isotopic constraints on the age and origin of the Brattskarvet intrusive suite, Dronning Maud Land, Antarctica [1993, eng] **E-48817**
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- Groeneweg, W.J.**
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Earth's crust in Antarctica and the effective relief of the continent [1992, eng] **L-48466**
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Local processes and global patterns: biomathematical models of bryozoan feeding currents and density-dependent aggregations in antarctic krill [1992, eng] **B-47750**

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Antarctic benthic ostracods. VIII. Ostracods from the Cruise ANT. 11/4 of RV *Meteor* to Elephant Island and the Antarctic Peninsula [1992, ger] **B-48337**
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Zooplankton distribution, biochemistry and genetics [1991, eng] **B-47634**
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Meiofauna communities along a depth transect off Halley Bay (Weddell Sea, Antarctica) [1992, eng] **B-47467**
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Progress and problems in taxonomy of antarctic saxicolous lecideoid lichens [1987, eng] **B-47493**
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Naming of igneous and metamorphic rock units in Antarctica: recommendation by the SCAR Working Group on Geology [1993, eng] **E-47907**
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United Kingdom national report [1992, eng] **B-49147**

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Vegetative reproduction of mosses in soil around the antarctic moss community. (Extended abstract) [1993, eng] **B-48614**
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Equilibrium constant of NO₂ with N₂O₄ and the temperature dependence of the visible spectrum of NO₂: a critical review and implications for measurements of NO₂ in the polar stratosphere [1993, eng] **I-48350**
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Mapping the seafloor, status report on AWI bathymetric charts of the Weddell Sea [1992, eng] **C-49069**
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Critical polygon size for ice-wedge formation in Svalbard and Antarctica [1993, eng] **E-49099**
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- Hirano, K.I.**
Distribution of REEs in HCL/HNO₃-residues of antarctic UOCs and its implications to their metamorphic geneses on UOC parent bodies [1992, eng] **E-49313**
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Spectral comparison between olivine-rich asteroids and pallasites [1993, eng] **E-48698**
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New insight of possible correlation between the Lützow- Holm Bay granulites (East Antarctica) and the Sri Lankan granulites [1992, eng] **E-49240**
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Abundance and biomass distribution of microbial assemblages at the surface in the oceanic province of antarctic ocean [1993, eng] **B-48602**
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Biogeochemical features of hydrocarbons in cyanobacterial mats from the McMurdo Dry Valleys, Antarctica [1993, eng] **B-48606**
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Mechanism for Antarctic Intermediate Water renewal in a world ocean model [1993, eng] **B-49271**
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Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica [1993, eng] **E-48830**
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Toward a high-resolution stable isotopic record of the southern ocean during the Pliocene-Pleistocene (4.8 to 0.8 Ma) [1992, eng] **J-47769**
Late Pleistocene paleoceanography of the South Atlantic sector of the southern ocean: Ocean Drilling Program hole 704A [1993, eng] **J-48760**
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Summer phytoplankton succession in Ellis Fjord, eastern Antarctica [1993, eng] **B-48980**
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Metabolic requirements of antarctic and temperate asteroid larvae [1991, eng] **B-47536**
- Hoese, B.**
Marsupium morphology and brooding biology of the antarctic giant isopod, *Glyptonotus antarcticus* Eights 1853 (Crustacea, Isopoda, Chaetiliidae) [1993, eng] **B-48327**
- Hofmann, D.J.**
Evidence for denitrification in the 1990 antarctic spring stratosphere: 1. Lidar and temperature measurements [1991, eng] **I-47732**
Evidence for denitrification in the 1990 antarctic spring stratosphere: II. Lidar and aerosol measurements [1991, eng] **I-48028**
- Hogan, A.W.**
Particle transport to the snow surface at the South Pole: the beginning of a tropospheric history [1993, eng] **F-48383**
Physical variation of water vapor, and the relation with carbon dioxide [1992, eng] **I-47377**
Meteorological surveys in support of ice airfields in Antarctica [1992, eng] **I-47944**
- Observation of recurrent temperature lapse near the surface at the South Pole [1988, eng] **I-48553**
- Holdsworth, B.K.**
Mesozoic radiolarian faunas from the Antarctic Peninsula: age, tectonic and palaeoceanographic significance [1992, eng] **E-49195**
- Holm-Hansen, O.**
Impact of natural ultraviolet radiation on rates of photosynthesis and on specific marine phytoplankton species [1992, eng] **B-47703**
AMLR program: Chlorophyll-*a* distribution and rates of primary production around Elephant Island [1991, eng] **B-47864**
AMLR program: Nutrient concentrations and primary production around Elephant Island during AMLR 1989-1990 [1991, eng] **B-47865**
AMLR program: Size distribution and species composition of the phytoplankton crop around Elephant Island [1991, eng] **B-47866**
Phytoplankton around Elephant Island, Antarctica [1993, eng] **B-48332**
- Ultraviolet radiation in Antarctica: inhibition of primary production [1993, eng] **B-49489**
- AMLR program: Physical and biological measurements over a frontal zone close to the continental shelf break [1991, eng] **J-47862**
- Holmes, M.A.**
Cretaceous subtropical weathering followed by cooling at 60S latitude: the mineral composition of southern Kerguelen Plateau sediment, Leg 120 [1992, eng] **E-47970**
Composition and origin of Cr-rich glauconitic sediments from the southern Kerguelen Plateau (Site 748) [1992, eng] **E-47971**
- Holmes, N.**
1991/92 New Zealand Antarctic Research Programme review [1992, eng] **A-47576**
- Holmlund, P.**
Radio-echo soundings along the lowermost part of the Bailey Ice Stream in the Filchner Ice Shelf basin [1992, eng] **F-49081**
Interpretation of basal ice conditions from radio-echo soundings in the eastern Heimefrontfjella and the southern Vestfjella mountain ranges, East Antarctica [1993, eng] **F-49424**
- Holt, B.**
Microwave remote sensing of polynyas [1992, eng] **F-48195**
- Holt, R.S.**
U.S. AMLR program: 1990-1991 field season activities [1991, eng] **B-47861**
- Holton, J.R.**
Comparison of observed (HALOE) and modeled (CCM2) methane and stratospheric water vapor [1993, eng] **I-49134**
- Home, R.W.**
Why explore Antarctica? Australian discussions in the 1880s [1992, eng] **A-49443**
- Hopkins, T.L.**
Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988) [1993, eng] **B-48391**
Trophic structure in open waters of the marginal ice zone in the Scotia-Weddell confluence region during spring (1983) [1993, eng] **B-49114**
- Horner, R.**
Ecology of sea ice biota. 1. Habitat, terminology, and methodology [1992, eng] **B-47478**
Ecology of sea ice biota. 2. Global significance [1992, eng] **B-47479**
- Horner, T.C.**
Permian and Triassic paleosols from the Beardmore Glacier region, Antarctica [1991, eng] **E-47551**
Sedimentology of a vertebrate bone-bearing bed in the Triassic Fremouw Formation at Gordon Valley, Beardmore Glacier region, Antarctica [1991, eng] **E-47555**
- Hoshiai, T.**
Ecology of sea ice biota. 1. Habitat, terminology, and methodology [1992, eng] **B-47478**
Ecology of sea ice biota. 2. Global significance [1992, eng] **B-47479**
- Proceedings of the NIPR Symposium on Polar Biology, No.6 [1993, eng] **B-48601**
- Japanese activities for BIOMASS [1992, eng] **B-49144**
- Overview and perspectives of the study on ice algae and its associated ecosystem [1993, eng] **B-49303**
- Hosie, G.W.**
Chitin production by krill [1993, eng] **B-48810**
- Hosoya, M.**
Newly developed snow vehicle (SM100S) for Antarctica. 2. Design of the system [1992, jpn] **G-48312**

- Newly developed snow vehicle (SM100S) for Antarctica. 5. Result of general performance tests [1992, jpn] **G-48315**
- Hotten, R.**
Mafic dykes of the Shackleton Range, Antarctica: petrography, geochemistry, isotope geochemistry, and palaeomagnetism [1993, ger] **E-48099**
- Howard-Williams, C.**
Desiccation and recovery of antarctic cyanobacterial mats [1992, eng] **B-47619**
Microbial communities and processes in antarctic flowing waters [1993, eng] **B-48753**
- Howington, J.P.**
Distribution of the McMurdo Station sewage plume [1992, eng] **G-48678**
Distribution of enteric bacteria in antarctic seawater surrounding a sewage outfall [1993, eng] **J-48450**
- Hu, R.M.**
Antarctic total ozone change correlated to the stratosphere wind and temperature during the polar night [1992, chi] **I-47431**
- Huang, Y.R.**
Analysis of the summer sea fog of Drake Passage [1992, chi] **I-47432**
- Hubberten, H.W.**
Geochemistry of Cenozoic ash layers from the Kerguelen Plateau (Leg 120): a first step toward a tephrostratigraphy of the southern Indian Ocean [1992, eng] **E-47973**
- Huber, B.A.**
Weddell Gyre warm-pool characteristics [1991, eng] **J-48358**
- Huber, B.T.**
Biogeography of Campanian-Maastrichtian calcareous plankton in the region of the southern ocean: paleogeographic and paleoclimatic implications [1992, eng] **E-47758**
Upper Cretaceous planktic foraminiferal biozonation for the Austral Realm [1992, eng] **E-48091**
- Hubold, G.**
Otolith structural and chemical analyses: the key to resolving age and growth of the antarctic silverfish, *Pleuragramma antarcticum* [1993, eng] **B-47903**
- Hughes, A.R.W.**
OMSKI for SANAE [1991, eng] **K-48903**
SANAE: the Durban connection [1991, eng] **K-48905**
- Hughes, G.L.M.**
Communications and the antarctic network [1993, eng] **A-48947**
- Huiskes, A.H.L.**
Ecology of lichens in the coastal regions of the Argentine Islands, Antarctic Peninsula—a preliminary report [1991, eng] **B-48971**
Ecology of macrolichens in antarctic coastal areas [1992, eng] **B-49166**
- Hulley, P.A.**
Meso- and bathypelagic ichthyofauna [1993, fre] **B-48496**
- Humler, E.**
Global correlations of mid-ocean-ridge basalt chemistry with seismic tomographic images [1993, eng] **L-48724**
- Hunter, D.R.**
Recent history of South African earth science research in Antarctica and adjacent regions [1991, eng] **E-48902**
- Huntley, M.E.**
Ecology of *Metridia gerlachei* in the western Bransfield Strait, Antarctica [1992, eng] **B-48505**
Calanoides acutus in Gerlache Strait, Antarctica. I. Distribution of late copepodite stages and reproduction during spring [1993, eng] **B-49435**
- Hureau, J.C.**
Reproduction in fish of the Weddell Sea [1993, eng] **B-48333**
- Hussain, S.M.**
Comment on the paper "Granites of Peterman Ranges, East Antarctica and implications on their genesis," and Reply [1992, eng] **E-49192**
- Huybrechts, P.**
Late Quaternary record of sea-level changes in the Antarctic [1993, eng] **J-49292**
- Iakovlev, V.N.**
Hydrometeorology of the southwestern Atlantic Ocean in 1987 [1992, rus] **J-48867**
- Ichii, T.**
Abundance, size and maturity of krill (*Euphausia superba*) in the krill fishing ground of Subarea 48.1 during the 1990/91 austral summer [1993, eng] **B-49373**
Differences in distribution and population structure of krill (*Euphausia superba*) between penguin and fur seal foraging areas near Seal Island [1993, eng] **B-49379**
- Ichinose, M.**
HF field strength data measured at Syowa Station, Antarctica from Jan. to Dec., 1991 [1993, eng] **K-48515**
- Igarashi, K.**
Records of radio aurora at Syowa Station, Antarctica in 1991 [1993, eng] **K-48513**
- Ihde, J.**
Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data [1993, eng] **F-48650**
- Ihmlé, P.F.**
Teleseismic detection of a slow precursor to the great 1989 Macquarie Ridge earthquake [1993, eng] **L-48966**
- Ikeda, Y.**
Mass distribution of antarctic ordinary chondrites and the estimation of the fall-to-specimen ratios [1992, eng] **E-47735**
- Ikeya, M.**
ESR applications to meteorite samples [1993, eng] **E-48709**
- Imber, M.J.**
Cephalopods eaten by wandering albatrosses (*Diomedea exulans* L.) breeding at six circumpolar localities [1992, eng] **B-48982**
- Imura, S.**
Vegetative reproduction of mosses in soil around the antarctic moss community. (Extended abstract) [1993, eng] **B-48614**
- Inan, U.S.**
Ducted whistlers and the burst loss of radiation-belt electrons to geomagnetically conjugate ionospheric regions [1991, eng] **K-48786**
- Inanaga, A.**
MOS-1/MSR mosaic data sets [1993, jpn] **F-49298**
- Incoll, P.**
Panelised forms of building construction for antarctic regions [1992, eng] **G-47694**
- India. Department of Ocean Development**
Workshop on Antarctic Studies, May 3-5, 1988, National Physical Laboratory: seven years of antarctic research [1988, eng] **A-48428**
- Innamorati, M.**
Phytoplankton distribution and environmental factors in Terra Nova Bay [1991, ita] **J-47661**
- Inokuchi, H.**
Rock-magnetic investigation of basalt from the southern Kerguelen Plateau (Leg 120) [1992, eng] **E-47968**
Paleolatitude of the southern Kerguelen Plateau inferred from the paleomagnetic study of Upper Cretaceous basalts [1992, eng] **E-47969**
High southern latitude magnetostratigraphy and rock magnetic properties of sediments from Sites 747, 749, and 751 [1992, eng] **E-47977**
Magnetostratigraphy of sediments from Sites 748 and 750, Leg 120 [1992, eng] **E-47978**
- Inoue, M.**
Floristic notes on lichens in the Fildes Peninsula of King George Island and Harmony Cove of Nelson Island, South Shetland Islands, the Antarctic [1993, eng] **B-48607**
Buellia subfrigida sp. nov. (Lichens, Buelliaceae) from Lützow-Holm Bay area and Prince Olav Coast, East Antarctica—The asexual sorediate species forming a species pair with *B. frigida* Darb [1993, eng] **B-48617**
- International Offshore and Polar Engineering Conference, 2nd, San Francisco, June 14-19, 1992**
Proceedings. Vol.2 [1992, eng] **F-47693**
- International Symposium on Remote Sensing of Snow and Ice, Boulder, CO, May 17-22, 1992**
Proceedings [1993, eng] **F-49403**
- Isaksson, E.**
Spatial and temporal patterns in snow accumulation and oxygen isotopes, western Dronning Maud Land, Antarctica [1991, eng] **F-49307**
- Isbell, J.L.**
Alluvial stratigraphic sequences within the Permian Transantarctic foreland basin, Beardmore Glacier area, Antarctica [1991, eng] **E-47553**
Lithofacies analysis of the Triassic Fremouw Formation at the Gordon Valley vertebrate site, Antarctica [1991, eng] **E-47554**
Vertebrate trackways from the Triassic Fremouw Formation, Queen Alexandra Range, Antarctica [1991, eng] **E-47557**
Fluvial sedimentology and basin analyses of the Permian Fairchild and Buckley Formations, Beardmore Glacier region, and the Weller Coal Measures, southern Victoria Land, Antarctica [1990, eng] **E-47753**
- Ishii, H.**
Abundance, size and maturity of krill (*Euphausia superba*) in the krill fishing ground of Subarea 48.1 during the 1990/91 austral summer [1993, eng] **B-49373**

- Ishikawa, M.**
Elements in tissues and organs of an antarctic fish, *Champsocephalus gunnari* [1993, eng] **B-48656**
- Ishikawa, S.**
Zooplankton data collected with BIOMASS Programme at Syowa Station in 1984 by JARE-25 [1992, eng] **B-48007**
- Ishiyama, M.**
Abundance and biomass distribution of microbial assemblages at the surface in the oceanic province of antarctic ocean [1993, eng] **B-48602**
- Ishizawa, K.**
Construction of ice domes at Asuka Station in Antarctica [1993, eng] **G-49336**
- Ishizuka, H.**
Explanatory text of geological map of Bergersenfjella, Sør Rondane Mountains, Antarctica [1993, eng] **E-49467**
- Ishman, S.E.**
Results of a multi-institutional research program in fjords along the Antarctic Peninsula: Cruise 90-7 of the R/V *Polar Duke* [1991, eng] **A-48359**
Circumantarctic benthic foraminifers [1993, eng] **E-48837**
Late Neogene antarctic glacio-eustatic record, Victoria Land Basin margin, Antarctica [1992, eng] **F-47771**
- Istituto Geografico Polare Silvio Zavatti**
Il Polo, Sep. 1992, Vol.3 [1992, ita] **A-48046**
- Italian Research on Antarctic Atmosphere, 3rd Workshop, Porano, Oct. 22-24, 1990**
Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.34 [1992, eng] **I-47385**
- Italian Research on Antarctic Atmosphere, 4th Workshop, Porano, Oct. 21-23, 1991**
Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.35 [1992, eng] **I-47785**
- Italy. Consiglio Nazionale delle Ricerche**
Ambiente Antartide, Jan. 28, 1993, No.5 [1993, ita] **A-47961**
- Italy, National Scientific Commission for Antarctica**
Straits of Magellan Oceanic Cruise, February-March 1991: Data report, Part I, physical, chemical and biological oceanography [1991, eng] **D-49032**
Oceanographic Campaign 1989-90: Data report, Part II, physical, chemical and biological oceanography [1992, eng] **J-49390**
- Italy. Programma Nazionale di Ricerche in Antartide**
Antarctic Project: biology. Collection of publications Jan. 1986-July 1991 [1991, eng] **B-47631**
Antarctic Project: Earth Sciences. Collection of publications Jan. 1986-July 1991 [1991, eng] **E-47665**
Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.1 [1991, eng] **I-47679**
Antarctic Project: physics of the atmosphere and cosmophysics. Collection of publications Jan. 1986-July 1991, Vol.2 [1991, eng] **I-47725**
Antarctic Project: environmental impact. Collection of publications Jan. 1986-July 1991 [1991, eng] **J-47614**
Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991 [1991, eng] **J-47660**
- Ito, T.**
Size distribution of antarctic submicron aerosols [1993, eng] **I-48380**
- IUrganov, L.N.**
Total atmospheric ozone measurements in Antarctica, 1988-1989 [1991, rus] **I-47598**
- Ivanchenko, O.P.**
Structure and quantitative development of phytoplankton in waters surrounding the Kerguelen Is. [1993, eng] **B-48485**
- Ivanova, I.N.**
Results of investigating the middle atmosphere at antarctic station Molo-dezhnaya [1991, eng] **I-47381**
- Iwata, S.**
Late Cenozoic glacial history in the Sør Rondane Mountains, East Antarctica [1992, eng] **E-49249**
- Iwatsuki, Z.**
Vegetative reproduction of mosses in soil around the antarctic moss community. (Extended abstract) [1993, eng] **B-48614**
- Izaguirre, I.**
Temporal and spatial variations of phytoplankton from Bocckella Lake (Hopc Bay, Antarctic Peninsula) [1993, eng] **B-48435**
- Jackson, S.**
Chitin digestion and assimilation by seabirds [1992, eng] **B-49344**
- Jacob, A.**
Physiology and ultrastructure of desiccation in the green alga *Prasiola crispa* from Antarctica [1992, eng] **B-47841**
- Jacobel, R.W.**
Radar studies at the mouths of ice streams D and E, Antarctica [1993, eng] **F-49421**
- Jacobs, S.S.**
Melting of ice shelves and the mass balance of Antarctica [1992, eng] **F-47514**
Ocean interactions with the base of Amery Ice Shelf, Antarctica [1992, eng] **F-47938**
Recent sea-ice retreat west of the Antarctic Peninsula [1993, eng] **F-49122**
- Jacques, G.**
Dynamics of nutrients and phytoplankton, and fluxes of carbon, nitrogen and silicon in the antarctic ocean [1992, eng] **J-47448**
- Jago, J.B.**
Middle Cambrian trilobites from the Ellsworth Mountains, West Antarctica [1992, eng] **E-48064**
- Janes, D.N.**
Reproductive effort and foraging energetics of Adélie penguins [1991, eng] **B-47545**
- Janiec, K.**
Freshwater micro- and meiofauna of Admiralty Bay, King George Island, South Shetland Islands [1993, eng] **B-48609**
- Janowska, E.**
Polychaetes of the shallow sublittoral of Admiralty Bay, King George Island, South Shetland Islands [1993, eng] **B-48438**
- Jansen, J.K.**
AMLR program: Foraging areas of krill-consuming penguins and fur seals near Seal Island, Antarctica [1991, eng] **B-47874**
AMLR program: Reproductive performance of chinstrap penguins on Seal Island, South Shetland Islands, Antarctica [1991, eng] **B-47875**
- Janssen, H.H.**
Marsupium morphology and brooding biology of the antarctic giant isopod, *Glyptonotus antarcticus* Eights 1853 (Crustacea, Isopoda, Chaetiliidae) [1993, eng] **B-48327**
Morphology, egg cocoons, and transmission paths of the antarctic leech *Glyptonotobdella antarctica* Sawyer and White, 1969 (Hirudinea: Rhynchobdelliformes: Piscicolidae) [1993, eng] **B-48918**
- Janssen, J.**
Under-ice observations of fish behavior at McMurdo Sound [1991, eng] **B-47541**
- Järnmark, C.**
PCBs and chlorinated pesticides in the atmosphere and aquatic organisms of Ross Island, Antarctica [1992, eng] **I-48671**
- Jarvis, E.P.**
Seismic characteristics of an airgun fired over snow [1993, eng] **F-48049**
- Jazdzewski, K.**
Morphology and systematic position of the antarctic and subantarctic synopiid *Cardenio paurodactylus* Stebbing, 1888 (Crustacea, Amphipoda) [1990, eng] **B-47843**
Survey and distributional patterns of the amphipod fauna of Admiralty Bay, King George Island, South Shetland Islands [1991, eng] **B-47890**
- Jean-Baptiste, P.**
Measurement of helium isotopes in Vostok ice core [1993, fre] **F-48202**
- Jeandel, C.**
Concentration and isotopic composition of Nd in the South Atlantic Ocean [1993, eng] **J-48844**
- Jefferies, S.M.**
Helioseismology from South Pole: 1990 high-resolution campaign [1991, eng] **K-48775**
- Jeffries, M.O.**
Structural characteristics and development of sea ice in the western Ross Sea [1993, eng] **F-47904**
Fast-ice properties and structure in McMurdo Sound [1991, eng] **F-48354**
Summer pack-ice properties and structure in the western Ross Sea [1991, eng] **F-48355**
- Jenkins, A.**
Melting of ice shelves and the mass balance of Antarctica [1992, eng] **F-47514**
Ice shelf basal melting: implications of a simple mathematical model [1991, eng] **F-48990**
Influence of Filchner-Ronne Ice Shelf on the Weddell Sea [1992, eng] **F-49064**
- Jenkins, W.J.**
Diffusion of cosmogenic He-3 in olivine and quartz: implications for surface exposure dating [1991, eng] **E-47444**

- Jennings, J.C., Jr.**
Mixed-layer nutrient contributions in the Weddell Gyre: winter 1989 and late austral spring 1990 [1991, eng] **B-48357**
- Jeong, H.C.**
Observations of seals around King Sejong Station during 1989 austral winter [1992, kor] **B-48171**
- Jerzumska, A.**
Gadiform remains from the La Meseta Formation (Eocene) of Seymour Island, West Antarctica [1992, eng] **E-49004**
- Jezek, K.C.**
Sea ice altimetry [1992, eng] **F-48192**
Co-registration of an antarctic digital elevation model with SSM/1 brightness temperatures [1993, eng] **F-49411**
Comparison of SMMR and SSM/1 passive microwave data collected over Antarctica [1993, eng] **F-49412**
Seasonal variations in brightness temperature for central Antarctica [1993, eng] **F-49423**
- Jia, P.Q.**
Characteristics of radiation during the polar day and night at Zhongshan Station, Antarctica [1993, eng] **I-48473**
Characteristic parameters of the turbulent exchange near the surface at Zhongshan Station in Antarctica [1993, chi] **I-48770**
Observational study of annual variations of the surface energy balance components at Zhongshan Station of Antarctica in 1990 [1993, eng] **I-49452**
- Johnson, B.**
Black carbon concentration in Byrd Station ice core: from 13,000 to 700 years before present [1992, eng] **I-47722**
- Johnson, E.R.**
Neutron monitor on King George Island [1992, eng] **K-47513**
- Johnson, S.**
Atmospheric excitation of nonseasonal polar motion [1993, eng] **L-49451**
- Johnston, C.G.**
Biogeochemistry of oxalate in the antarctic cryptoendolithic lichen-dominated community [1993, eng] **B-47505**
Microbial biogeochemistry in antarctic cryptoendolithic communities [1992, eng] **B-49293**
- Johnston, P.V.**
Evidence for heterogeneous reactions in the antarctic autumn stratosphere [1993, eng] **I-47610**
- Jonas, M.**
New results of structural investigations in the central part of the FRIS [1992, eng] **F-49066**
- Jones, D.A.**
Time and space spectral analyses of Southern Hemisphere sea level pressure variability [1993, eng] **I-48557**
- Jones-Lee, A.**
Relationship between phosphorus load and eutrophication response in Lake Vanda [1993, eng] **B-48645**
- Jones, M.**
Moult in Black-browed and Grey-headed albatrosses *Diomedea melanophrys* and *D. chrysostoma* [1993, eng] **B-48424**
- Jones, M.R.R.**
Trophic relations of the cephalopod *Martialia hyadesi* (Teuthoidea: Ommastrephidae) at the Antarctic Polar Front, Scotia Sea [1992, eng] **B-47577**
- Jones, P.D.**
Decadal timescale links between Antarctic Peninsula ice-core oxygen-18, deuterium and temperature [1993, eng] **I-48540**
- Jonsson, S.**
Local climate and mass balance of a blue-ice area in western Dronning Maud Land, Antarctica [1990, eng] **I-48387**
- Jordan, R.W.**
Diatom genus *Proboscia* in antarctic waters [1991, eng] **B-47435**
- Jordan, T.H.**
Teleseismic detection of a slow precursor to the great 1989 Macquarie Ridge earthquake [1993, eng] **L-48966**
- Joshi, A.**
Granites of Petermann Ranges, East Antarctica and implications on their genesis [1991, eng] **E-47491**
Comment on the paper "Granites of Peterman Ranges, East Antarctica and implications on their genesis," and Reply [1992, eng] **E-49192**
- Joshi, M.C.**
Availability of photosynthetically active radiation in Antarctica [1993, eng] **I-48855**
- Joshi, R.P.**
Availability of photosynthetically active radiation in Antarctica [1993, eng] **I-48855**
- Journal of marine research**
Printer's corrigendum [1993, eng] **J-49150**
- Joussau, S.**
Paleoclimatic tracers: an investigation using an atmospheric general circulation model under ice age conditions. 1. Desert dust [1993, eng] **I-48083**
- Jouventin, P.**
Population changes, movements of southern elephant seals on Crozet and Kerguelen Archipelagos in the last decade [1992, eng] **B-47471**
High annual variability in reproductive success and survival of an antarctic seabird, the snow petrel *Pagodroma nivea*. A 27-year study [1993, eng] **B-49197**
Foraging strategies of Wandering Albatrosses through the breeding season: a study using satellite telemetry [1993, eng] **B-49345**
- Jouzel, J.**
Last deglaciation in Antarctica: further evidence of a "Younger Dryas" type climatic event [1993, eng] **F-48110**
Ice core record: past archive of the climate and signpost to the future [1992, eng] **F-48261**
Extending the Vostok ice-core record of palaeoclimate to the penultimate glacial period [1993, eng] **F-48725**
Glacials-interglacials in Vostok: climate and greenhouse gases [1993, eng] **I-48738**
- Joyner, C.C.**
Ice-covered regions in international law [1991, eng] **M-49275**
- Jull, A.J.T.**
AMS C-14 ages of Yamato achondritic meteorites [1993, eng] **E-48705**
Cosmogenic nuclides in ice sheets [1992, eng] **F-47546**
- Jun, H.K.**
Installation of the ground-based telecommunications system with polar orbiting satellites at King Sejong antarctic station [1992, kor] **G-48168**
- Jwa, Y.J.**
Potassium-argon radiometric ages of volcanic rocks from the Fildes Peninsula, King George Island, Antarctica [1991, kor] **E-47581**
- Kadota, S.**
Abundance and biomass distribution of microbial assemblages at the surface in the oceanic province of antarctic ocean [1993, eng] **B-48602**
- Kagami, H.**
Sm-Nd and Rb-Sr ages of metamorphic rocks from the Sör Rondane Mountains, East Antarctica [1992, eng] **E-49237**
- Kainuma, S.**
HF field strength data measured at Syowa Station, Antarctica from Jan. to Dec., 1991 [1993, eng] **K-48515**
- Kalikhman, M.IA.**
Turbulence in the antarctic middle atmosphere [1992, rus] **I-48863**
- Kalinowski, J.**
Distribution of krill biomass in the Ross Sea, December 89- January 90 [1992, eng] **B-49402**
- Kallemeyn, G.W.**
Compositional classification of chondrites: V. The Karoonda (CK) group of carbonaceous chondrites [1991, eng] **E-47379**
Geochemical investigation of two lunar mare meteorites: Yamato-793169 and Asuka-881757 [1993, eng] **E-48687**
- Kamb, B.**
Glacier flow modeling [1993, eng] **F-48848**
- Kamenev, E.**
Soviet geological maps of the Prince Charles Mountains, East Antarctic Shield [1993, eng] **E-49442**
- Kaminuma, K.**
Location and elevation of Syowa Station, Antarctica [1993, jpn] **C-49338**
Seismological bulletin of Syowa Station, Antarctica, 1991 [1993, eng] **L-48409**
Present status of seismic network in Antarctica [1992, eng] **L-49244**
Determination of the gravity field around Antarctica using satellite altimeter data and surface gravity data—A review of the recent studies [1992, eng] **L-49245**
Intermittent micro-seismic activity in the vicinity of Syowa Station, East Antarctica [1992, eng] **L-49246**
Seismological observations by a three-component broadband digital seismograph at Syowa Station, Antarctica [1992, eng] **L-49248**
- Kamionka, L.**
Distribution and abundance of krill *Euphausia superba* Dana at the ice edge zone between Elephant Island and the South Orkney Islands [1991, eng] **B-48236**

- Kamiyama, K.**
Atmospheric conditions reflected in chemical components in snow over east Queen Maud Land, Antarctica [1992, eng] **F-48185**
- Kanda, H.**
Antarctic science conference, Germany, 1991 [1992, jpn] **A-48416**
Chromosome study on the submerged moss collected from antarctic lakes [1993, eng] **B-48608**
Vegetative reproduction of mosses in soil around the antarctic moss community. (Extended abstract) [1993, eng] **B-48614**
Investigation of the bryophytes in the Fildes Peninsula, King George Island, Antarctica [1993, chi] **B-48772**
- Kaneoka, I.**
Ar-40/Ar-39 analyses of a lunar meteorite (Yamato-86032) and a few LL3 and LL4 chondrites from Antarctica [1993, eng] **E-48690**
- Kang, S.H.**
Fragilariopsis cylindrus (Grunow) Krieger: the most abundant diatom in water column assemblages of antarctic marginal ice-edge zones [1992, eng] **B-47622**
Phytoplankton in the Weddell Sea, Antarctica: composition, abundance and distribution in water-column assemblages of the marginal ice-edge zone during austral autumn [1993, eng] **B-48799**
Phytoplankton in the Antarctic Marginal Ice Zone [1992, eng] **B-49294**
- Kanzawa, H.**
Report on Workshop "Study of the polar atmosphere and cryosphere using satellite data with surface validation observations including unmanned one" [1993, jpn] **A-49340**
Stratospheric sudden cooling after solar proton event over Syowa Station, Antarctica [1992, eng] **I-47490**
- Kappen, L.**
Photosynthetic activity of lichens in natural habitats in the maritime Antarctic [1987, eng] **B-47494**
Long-term productivity in the cryptoendolithic microbial community of the Ross Desert, Antarctica [1993, eng] **B-48336**
Lichens in the antarctic region [1993, eng] **B-48751**
Age estimation of antarctic macrolichens by radiocarbon measurements [1992, eng] **B-48824**
- Karal, K.**
Proceedings. Vol.2 [1992, eng] **F-47693**
- Karentz, D.**
Ozone depletion and UV-B radiation in the Antarctic—limitations to ecological assessment [1992, eng] **B-48662**
- Karl, D.M.**
Bacterial abundances during the 1989-1990 austral summer phytoplankton bloom in the Gerlache Strait [1991, eng] **B-47528**
Massive prasinophyte bloom in northern Gerlache Strait [1991, eng] **B-47531**
RACER: Phytoplankton growth rates in the northern Gerlache Strait during the spring bloom of 1989 [1991, eng] **B-47532**
Microbial processes in the southern oceans [1993, eng] **B-48741**
Grounding of the *Bahia Paraíso*: microbial ecology of the 1989 antarctic oil spill [1992, eng] **J-47438**
- Karnatsevich, I.V.**
Energy resource of winter season in Siberia and polar areas [1992, eng] **I-47653**
- Karpinskiĭ, M.G.**
Plankton distribution in the subantarctic areas of the Pacific Ocean in the autumn and winter of 1983 [1991, rus] **B-47896**
- Karsten, A.**
Trigonometric leveling 1992 on Ronne Ice Shelf [1992, eng] **F-49075**
- Karsten, U.**
Dimethylsulphoniopropionate (DMSP) accumulation in green macroalgae from polar to temperate regions: interactive effects of light versus salinity and light versus temperature [1992, eng] **B-47621**
- Kartavseff, A.**
MD 68/SUZIL expedition on board the *Marion Dufresne*, Apr. 12-May 20, 1991. Vol.1: Hydrology [1993, fre] **J-48468**
- Kasting, J.F.**
Paradox lost and paradox found [1992, eng] **I-47424**
- Kato, A.**
Diving performance of Adélie penguins in relation to food in fast sea-ice areas: comparison between years [1993, eng] **B-49431**
- Kattner, G.**
Lipid content and fatty acid composition of algal communities in sea-ice and water from the Weddell Sea (Antarctica) [1993, eng] **B-49116**
- Kaup, E.**
Limnological features of the saline lakes of the Bunger Hills (Wilkes Land, Antarctica) [1993, eng] **B-47902**
- Kawaguchi, K.**
Zooplankton data collected with BIOMASS Programme at Syowa Station in 1984 by JARE-25 [1992, eng] **B-48007**
- Kawaguchi, S.**
Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6 [1992, eng] **F-48179**
- Kawamura, T.**
Seasonal variations of the flow and oceanic structure under fast ice in Lützow-Holm Bay, Antarctica [1993, eng] **J-49300**
- Kaye, S.**
Australian law in Antarctica [1993, eng] **M-48729**
- Keage, P.L.**
Conservation strategy for the Australian Antarctic Territory [1993, eng] **B-48735**
- Keil, K.**
Shock metamorphism of carbonaceous chondrites [1992, eng] **E-48344**
- Keir, R.S.**
Are atmospheric CO₂ content and Pleistocene climate connected by wind speed over a polar Mediterranean Sea [1993, eng] **I-49448**
- Keller, G.**
Eocene-Oligocene faunal turnover in planktic foraminifera, and antarctic glaciation [1992, eng] **E-48287**
Cretaceous-Tertiary boundary transition in the antarctic ocean and its global implications [1993, eng] **E-48471**
Paleocene-Eocene transition in the antarctic Indian Ocean: inference from planktic foraminifera [1993, eng] **J-48472**
- Keller, J.**
Geochemistry of Cenozoic ash layers from the Kerguelen Plateau (Leg 120): a first step toward a tephrostratigraphy of the southern Indian Ocean [1992, eng] **E-47973**
- Keller, R.A.**
Geological fieldwork on Deception Island and King George Island, South Shetland Islands [1991, eng] **E-46768**
Geological fieldwork on Deception Island and King George Island, South Shetland Islands [1991, eng] **E-47568**
Chemistry of Quaternary volcanism in the Bransfield Strait and South Shetland Islands: preliminary results [1991, eng] **E-48369**
- Kellermann, A.K.**
Techniques for retrospective analyses of environmental conditions influencing the early life history on antarctic fishes [1991, eng] **B-47542**
- Kellogg, D.E.**
Radiocarbon dates from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history [1991, eng] **E-48000**
Oxygen isotope data from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history [1991, eng] **F-47999**
- Kellogg, T.B.**
Radiocarbon dates from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history [1991, eng] **E-48000**
Oxygen isotope data from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history [1991, eng] **F-47999**
- Kelly, H.P.**
Phytoplankton sinking rates in the Ross Sea [1991, eng] **B-47530**
- Kelly, P.**
Persistent patterns in the geomagnetic field over the past 2.5 Myr [1993, eng] **L-49267**
- Kelly, S.R.A.**
Marine molluscan constraints on the age of Cretaceous fossil forests of Alexander Island, Antarctica [1992, eng] **E-47573**
Lithostratigraphy of the uppermost Fossil Bluff group (Early Cretaceous) of Alexander Island, Antarctica: history of an Albian regression [1993, eng] **E-48394**
- Kelty, J.**
Bore-hole survey at Camp Century, 1989 [1993, eng] **F-48048**
- Kennedy, A.D.**
Photosynthetic response of the antarctic moss *Polytrichum alpestre* Hoppe to low temperatures and freeze-thaw stress [1993, eng] **B-48634**
- Kennedy, H.**
Performance of the *Nathaniel B. Palmer* in ice [1993, eng] **G-48943**
- Kenner, R.D.**
Laboratory measurements of the loss of ClO on Pyrex, ice and NAT at 183 K [1993, eng] **I-48106**
- Kennett, J.P.**
Antarctic paleoenvironment: a perspective on global change. Part one [1992, eng] **J-47756**
- Kennicutt, M.C., II**
Hydrocarbon contamination on the Antarctic Peninsula. II. Arthur Harbor inter- and subtidal limpets (*Nacella concinna*) [1992, eng] **B-47713**

- Hydrocarbon contamination on the Antarctic Peninsula. I. Arthur Harbor-subtidal sediments [1992, eng] **E-47712**
- Kennicutt, M.C., Jr.**
Evidence of polycyclic aromatic hydrocarbon (PAH) exposure in fish from the Antarctic Peninsula [1992, eng] **B-48676**
Hydrocarbon contamination on the Antarctic Peninsula: III. The *Bahia Paraiso*--two years after the spill [1992, eng] **J-48674**
- Kerr, R.A.**
Ozone hole reaches new low [1993, eng] **I-49273**
- Kerridge, J.F.**
Origins of organic matter in meteorites [1993, eng] **E-48701**
- Kerry, E.**
Bioremediation of experimental petroleum spills on mineral soils in the Vestfold Hills, Antarctica [1993, eng] **E-48330**
- Kerry, K.R.**
Use of an automated weighing and recording system for the study of the biology of Adélie penguins (*Pygoscelis adeliae*) [1993, eng] **B-48604**
Foraging range of Adélie penguins at Béchervaise Island, Mac. Robertson Land, Antarctica, and its overlap with the krill fishery [1993, eng] **B-49382**
- Key, J.**
Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**
- Keys, J.G.**
Evidence for heterogeneous reactions in the antarctic autumn stratosphere [1993, eng] **I-47610**
Measurements and model calculations of HCl column amounts and related parameters over McMurdo during the austral spring in 1989 [1992, eng] **I-47775**
DSIR's stratospheric trace gas programme in Antarctica [1992, eng] **I-47804**
Increased chlorine dioxide over Antarctica caused by volcanic aerosols from Mount Pinatubo [1993, eng] **I-48348**
- Keyser, L.F.**
Morphology of nitric acid and water ice films [1993, eng] **I-49121**
Uptake of HCl in water ice and nitric acid ice films [1993, eng] **I-49258**
Surface areas and porosities of ices used to simulate stratospheric clouds [1993, eng] **I-49359**
- Khodzha-Akhmedov, Ch.L.**
Ionospheric radio channel characteristics based on oblique-incidence soundings [1991, rus] **K-47590**
Synchronization of the operation of oblique-incidence ionospheric sounding stations [1991, rus] **K-47591**
- Khromov, N.S.**
Results of plankton studies conducted by VNIRO on board the R/V *Akademik Knipovich* in the Antarctic [1991, rus] **B-47894**
- Kiernan, K.**
Glacial climates in the antarctic region during the Late Paleogene: evidence from northwest Tasmania, Australia [1993, eng] **I-47931**
- Kiest, K.A.**
Relationship of diet to prey abundance and the foraging behavior of *Trematomus bernacchii* [1993, eng] **B-48915**
- Killworth, P.D.**
Equivalent-barotropic mode in the Fine Resolution Antarctic Model [1992, eng] **J-47571**
Distribution of kinetic energy in the southern ocean: a comparison between observations and an eddy resolving general circulation model [1992, eng] **J-48264**
- Kim, D.H.**
Snowdrift around antarctic building—effects of corner geometry and wind incidence [1992, eng] **F-47697**
Snowdrift around buildings for antarctic environment [1992, eng] **F-48047**
Modelling of snowdrift around prismatic buildings for antarctic environment [1992, eng] **G-48558**
Snowdrift around antarctic buildings—effects of corner geometry and wind incidence [1993, eng] **G-48596**
- Kim, D.Y.**
Report on the summer expedition (1991/1992) of the 5th Korea Antarctic Research Program [1992, kor] **D-48170**
Oceanographic conditions in the Bransfield Strait and in the limits of the adjacent seas [1992, kor] **J-48162**
- Kim, K.H.**
Biostratigraphic and paleoceanographic significance of Paleogene radiolarian assemblages from the subantarctic south Atlantic [1991, eng] **E-47754**
- Kim, Y.**
Marine seismic survey off Brabant Island and in Gerlache Strait, Antarctic Peninsula [1992, kor] **E-48167**
- Kimbrough, D.L.**
Geological and geophysical investigations in the northern Ford Ranges, Marie Byrd Land, West Antarctica [1991, eng] **E-47565**
- Kimura, M.**
Mass distribution of antarctic ordinary chondrites and the estimation of the fall-to-specimen ratios [1992, eng] **E-47735**
Mineralogy of antarctic aubrites, Yamato-793592 and Allan Hills-78113: comparison with non-antarctic aubrites and E-chondrites [1993, eng] **E-48696**
Ca-, Al-rich inclusions in the unique chondrite ALH85085: petrology, chemistry, and isotopic compositions [1993, eng] **E-48805**
- Kimura, N.**
Chlorophyll distribution derived from CZCS and fishing ground of *Euphausia superba* in the antarctic ocean [1993, jpn] **B-49302**
- King, E.C.**
Seismic characteristics of an airgun fired over snow [1993, eng] **F-48049**
- King, J.C.**
Atmospheric water-vapour transport to Antarctica inferred from radiosonde data [1993, eng] **I-48090**
Recent climate variability in the Antarctic Peninsula [1991, eng] **I-48657**
Control of near-surface winds over an antarctic ice shelf [1993, eng] **I-49043**
- Kinny, P.D.**
Zircon ages and the distribution of Archaean and Proterozoic rocks in the Rauer Islands [1993, eng] **E-48441**
- Kipfstuhl, J.**
Origin of green icebergs in Antarctica [1992, eng] **F-47939**
- Kipfstuhl, S.**
Preliminary results of the in situ core processing of the new 320 m ice core from the central Filchner-Ronne Ice Shelf: ECM, AC conductivity and density [1992, eng] **F-49073**
- Kirst, G.O.**
Dimethylsulphoniopropionate (DMSP) accumulation in green macroalgae from polar to temperate regions: interactive effects of light versus salinity and light versus temperature [1992, eng] **B-47621**
Physiology and ultrastructure of desiccation in the green alga *Prasiola crispa* from Antarctica [1992, eng] **B-47841**
- Kito, K.**
Plectus antarcticus de Man, 1904 and *P. frigophilus* Kirjanova, 1958 (Nematoda: Plectidae), with emphasis on the male, from the Soya Coast, East Antarctica [1991, eng] **B-49194**
- Kittel, W.**
Macrozooplankton near the pack ice between Elephant Island and the South Orkney Islands (December 1988-January 1989) [1991, eng] **B-48234**
- Kivi, K.**
Effects of antarctic sea ice biota on seeding as studied in aquarium experiments [1992, eng] **B-47469**
- Kivivuori, L.A.**
Thermal tolerance and fluidity of neuronal and branchial membranes of an antarctic amphipod (*Orchomene plebs*): a comparison with a Baltic isopod (*Saduria entomon*) [1993, eng] **B-48832**
- Kjome, N.T.**
Study of polar stratospheric clouds at the South Pole [1991, eng] **I-48213**
Simultaneous ozone and polar stratospheric cloud observations at South Pole Station during winter and spring 1991 [1993, eng] **I-49040**
- Klages, N.T.W.**
Diet of the Wandering Albatross *Diomedea exulans* at subantarctic Marion Island [1992, eng] **B-47496**
- Klee, S.**
Age relations of the high grade metamorphic rocks in the Terra Nova Bay area, north Victoria Land, Antarctica: a preliminary report [1992, eng] **E-47825**
- Klein, K.**
Methodology for full-scale iceberg impact experiments in the Antarctic [1992, eng] **F-47700**
- Kleinschmidt, G.**
Structural field observations in the basement between Fry and Reeves Glaciers, Victoria Land, Antarctica [1992, eng] **E-47826**
Gradational east-west increase in metamorphism in the basement rocks of the Helliwell Hills, Wilson Terrane, north Victoria Land, Antarctica [1992, eng] **E-47829**
Southern continuation of the Wilson thrust [1992, eng] **E-47831**

Kleinschmidt, G. (cont.)

Structural observations in the Robertson Bay terrane and their implications
[1992, eng] **E-47832**

New field data from Surgeon Island, north Victoria Land, Antarctica [1992,
eng] **E-47833**

Structural continuity of the Ross and Delamerian orogens of Antarctica and
Australia along the margin of the paleo-Pacific [1993, eng] **E-48247**

Klinck, J.M.

Effects of wind, density, and bathymetry on a one-layer Southern Ocean
model [1992, eng] **J-47937**

Klöck, W.

Compositions and mineralogies of unmelted polar micrometeorites: similari-
ties and differences with IDPs and meteorites [1993, eng] **E-48702**

Klokov, V.D.

Development of a wheeled runway for McMurdo on the Ross Ice Shelf
[1992, eng] **G-47783**

Klopov, V.P.

Effects of intercontinental flights to the Antarctic on physiological and bio-
chemical parameters in laboratory animals [1992, rus] **B-48883**

Klöser, H.

Seasonal variation of algal growth conditions in sheltered antarctic bays: the
example of Potter Cove (King George Island, South Shetlands) [1993,
eng] **J-49480**

Klusek, Z.

Krill migration at the ice edge zone (December 1988-January 1989) [1991,
eng] **B-48235**

Distribution and abundance of krill *Euphausia superba* Dana at the ice edge
zone between Elephant Island and the South Orkney Islands [1991,
eng] **B-48236**

Knight, C.A.

Adsorption to ice of fish antifreeze glycopeptides 7 and 8 [1993, eng]
B-48475

Kobayashi, Y.

Statistical characteristics of the polarization of Pc1 micropulsations at high
latitudes [1992, eng] **K-47934**

Koblinsky, C.J.

Postprocessing of satellite altimetry return signals for improved sea surface
topography accuracy [1993, eng] **J-47723**

Koblitz, S.

Summer distribution and abundance of fish larvae related with environmen-
tal variables (temperature and salinity) in the Admiralty Bay, Antarctica
[1992, eng] **B-49447**

Kock, K.H.

Antarctic fish and fisheries [1992, eng] **B-48088**

Reproduction in fish of the Weddell Sea [1993, eng] **B-48333**

Kock, R.

Planktonic ostracods along the Antarctic Peninsula during the 1989/90 sum-
mer season [1993, eng] **B-49231**

Kocmur, S.F.

AMLR program: Nutrient concentrations and primary production around
Elephant Island during AMLR 1989-1990 [1991, eng] **B-47865**

Koda, H.

Survey of emperor penguins during 1990 (JARE-31) [1991, jpn] **B-48421**

Kodama, M.

Stratospheric sudden cooling after solar proton event over Syowa Station,
Antarctica [1992, eng] **I-47490**

Ghost images of auroral X ray sources observed by directional balloon-borne
detectors [1989, eng] **K-49384**

Kodama, S.

Intraseasonal variability of katabatic wind over East Antarctica and plane-
tary flow regime in the southern hemisphere [1993, eng] **I-49051**

Kodama, T.

MOS-1 multi-sensor data set and sea ice study [1991, eng] **F-48317**

Koeberl, C.

Gabbroic lunar mare meteorites Asuka-881757 (Asuka-31) and Yamato-
793169: geochemical and mineralogical study [1993, eng] **E-48686**

Koehler, B.G.

Fourier transform infrared studies of the interactions of HCl with model
polar stratospheric cloud films [1993, eng] **I-48560**

Kohlmeyer, C.R.C.

Petroleum pollution prevention, response and remediation in the Antarctic:
an equipment and procedural approach [1993, eng] **G-48933**

Kohnen, H.

MICROSAT based communication system for rescue services and world-
wide data transfer from the Antarctic [1993, eng] **A-48946**

Mobile oil spill fighting unit [1993, eng] **G-48934**

Transport concept at the antarctic stations and for field operations of the
Alfred Wegener Institute [1993, eng] **G-48941**

Kohn, T.

Stratospheric sudden cooling after solar proton event over Syowa Station,
Antarctica [1992, eng] **I-47490**

Kojima, H.

Asuka-87 and Asuka-88 collections of antarctic meteorites: search, discover-
ies, initial processing, and preliminary identification and classification
[1993, eng] **E-48693**

Kokawa, T.

Construction of ice domes at Asuka Station in Antarctica [1993, eng]
G-49336

Kokubun, S.

Summer activity of JARE-32 [1991, jpn] **A-48419**

Kolb, C.E.

OH reaction kinetics and atmospheric lifetimes of CF₃CFHCF₃ and
CF₃CH₂Br [1993, eng] **I-48107**

Komiya, M.

Analyses of carboxylic acids and hydrocarbons in antarctic carbonaceous
chondrites, Yamato-74662 and Yamato-793321 [1989, eng] **E-47851**

Examination of organic compounds from insoluble organic matter isolated
from some antarctic carbonaceous chondrites by heating experiments
[1993, eng] **E-48172**

Kondrat'ev, K.IA

Global climate [1992, rus] **I-49087**

Kondratiuk, A.I.

Total atmospheric ozone measurements in Antarctica, 1988-1989 [1991,
rus] **I-47598**

König-Langlo, G.

Meteorological data of the Georg-von-Neumayer-Station (Antarctica) for
1988, 1989, 1990 and 1991 [1992, eng] **I-47744**

Konishi, H.

Study of precipitation in the coastal area of Antarctica as observed at Syowa
Station using a vertical pointing radar [1992, eng] **I-48309**

Konopacka, A.

Survey and distributional patterns of the amphipod fauna of Admiralty Bay,
King George Island, South Shetland Islands [1991, eng] **B-47890**

Kooyman, G.L.

Natural history of Ross Sea emperor penguin colonies [1991, eng] **B-47858**

Breeding habitats of emperor penguins in the western Ross Sea [1993, eng]
B-48436

Annual cycles of diving behavior and ecology of the Weddell seal [1992,
eng] **B-49179**

Kopczyńska, E.

Distribution of microflagellates and diatoms in the sea-ice zone between
Elephant Island and the South Orkney Islands (December 1988-January
1989) [1991, eng] **B-48231**

Distribution of net phytoplankton in the sea-ice zone between Elephant
Island and the South Orkney Islands (December 1988-January 1989)
[1991, eng] **B-48232**

Korea Ocean Research and Development Institute

Annual report 1992 [1992, eng] **A-49468**

Körner, U.

Volcanic ash particles as carriers of remanent magnetization in deep-sea
sediments from the Kerguelen Plateau [1993, eng] **E-48999**

Kornicker, L.S.

Biology of the antarctic seas XXI [1990, eng] **B-48404**

Koshel'kov, IU.P.

Temperature trends in the lower antarctic stratosphere [1992, rus]
I-48864

Kosobokova, K.N.

Experimental study of the fecundity of the antarctic copepod *Calanus pro-*
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Feeding, metabolism and body composition of the antarctic copepod *Cal-*
anus propinquus Brady with special reference to its life cycle [1993, eng]
B-48321

Kostiaev, A.G.

Geochemical studies of loose Cenozoic sediments of East Antarctica [1992,
rus] **E-48870**

Kotliakov, V.M.

Glaciological mapping and global seasonal snow storage [1992, eng]
F-47656

Global changes in the environment as "mirrored" in an ice core [1992, rus]
I-47425

Global changes during the latest glacial-interglacial cycle [1992, eng]
I-47655

- Kottmeier, C.**
Wind forcing and ice motion in the Weddell Sea region [1992, eng] **F-47774**
Meteorological research using a high mast on an antarctic ice shelf [1987, eng] **I-48160**
Internal atmospheric gravity waves near the coast of Antarctica [1993, eng] **I-49318**
- Koubbi, P.**
Macroplankton spatial distribution around the Kerguelen Is. during summer 1987-1988 and winter 1987 [1993, fre] **B-48486**
Fish eggs, larvae and juveniles present in the plankton of the waters around the Kerguelen Is. [1993, fre] **B-48489**
- Kovalev, A.D.**
Hydrometeorology of the southwestern Atlantic Ocean in 1987 [1992, rus] **J-48867**
- Kovalev, S.M.**
Influence of structural anisotropy of sea ice on its mechanical and electrical properties [1992, eng] **F-47699**
- Kovshova, E.N.**
Temperature trends in the lower antarctic stratosphere [1992, rus] **I-48864**
- Kraay, G.W.**
Influence of physical and biological processes on the concentration of O₂ and CO₂ in the ice-covered Weddell Sea in the spring of 1988 [1992, eng] **J-47449**
- Krähenbühl, U.**
Depth-profiles and surface enrichment of the halogens in four antarctic H₅ chondrites and in two non-antarctic chondrites [1993, eng] **E-48399**
- Krasnikov, N.N.**
Geological structure of the Fisher massif, eastern Antarctica [1992, eng] **E-48040**
- Krause, G.**
Antarctic Coastal Current in the southeastern Weddell Sea [1992, eng] **J-47450**
- Kremer, J.N.**
Simulated antarctic fast ice ecosystem [1993, eng] **F-48537**
- Krippner, S.**
Therapsids, temnospondyls, and dinosaurs from the Fremouw and Falla Formations, Beardmore Glacier region, Antarctica [1991, eng] **E-47556**
- Krissek, L.A.**
Permian and Triassic paleosols from the Beardmore Glacier region, Antarctica [1991, eng] **E-47551**
Sedimentology of a vertebrate bone-bearing bed in the Triassic Fremouw Formation at Gordon Valley, Beardmore Glacier region, Antarctica [1991, eng] **E-47555**
- Kristensen, M.**
Activities within the Aurora Programme—Field season 1991/92 [1992, eng] **F-49082**
- Kristiansen, S.**
Ice algae during EPOS, leg 1: assemblages, biomass, origin and nutrients [1993, eng] **B-48326**
Nitrogen uptake in the Weddell Sea during late winter and spring [1992, eng] **J-47459**
- Kriwoken, L.K.**
Hobart, Tasmania: antarctic and southern ocean connections [1993, eng] **A-48339**
- Krueger, A.J.**
Nimbus-7 Total Ozone Mapping Spectrometer (TOMS) antarctic ozone atlas: August through November 1991 [1992, eng] **I-48511**
- Krynauw, J.R.**
Naming of igneous and metamorphic rock units in Antarctica: recommendation by the SCAR Working Group on Geology [1993, eng] **E-47907**
- Krysell, M.**
Carbon tetrachloride and methyl chloroform as tracers of deep water formation in the Weddell Sea, Antarctica [1992, eng] **J-47434**
- Kubik, P.W.**
Terrestrial ages of antarctic meteorites [1991, eng] **E-47991**
- Kudenov, J.D.**
Amphinomidae and Euphrosinidae (Annelida: Polychaeta) principally from antarctica, the southern ocean, and subantarctic regions [1993, eng] **B-48627**
- Kudriashov, B.B.**
Core drilling by electromechanical drill [1993, eng] **F-48732**
- Kuehne, J.**
Atmospheric excitation of nonseasonal polar motion [1993, eng] **L-49451**
- Kühn, A.**
Photosynthetic activity of lichens in natural habitats in the maritime Antarctic [1987, eng] **B-47494**
- Kuhn, G.**
Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica [1993, eng] **E-48433**
Sub-bottom profiling and sedimentological studies in the southern Weddell Sea, Antarctica: evidence for large-scale erosional/depositional processes [1993, eng] **E-48827**
Acoustical characterization of sediments by *Parasound* and 3.5kHz systems: related sedimentary processes on the southeastern Weddell Sea continental slope, Antarctica [1993, eng] **J-48962**
- Kukkonen, I.T.**
Physical properties of 368 meteorites: implications for meteorite magnetism and planetary geophysics [1993, eng] **E-48708**
- Kumar, N.**
Pa-231/Th-230 ratios in sediments as a proxy for past changes in southern ocean productivity [1993, eng] **J-48030**
- Kumer, J.B.**
CLAES observations of ClONO₂ and HNO₃ in the antarctic stratosphere, between June 15 and September 17, 1992 [1993, eng] **I-49126**
CLAES south-looking aerosol observations for 1992 [1993, eng] **I-49132**
- Kunitake, M.**
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Aethotaxis mitopteryx, a high-Antarctic fish with benthopelagic mode of life [1992, eng] **B-47602**
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PCBs and chlorinated pesticides in the atmosphere and aquatic organisms of Ross Island, Antarctica [1992, eng] **I-48671**
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Quaternary diatoms and cysts from Xihu Lake on Fildes Peninsula of King
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- Li, S.K.**
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- Lin, Y.T.**
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Meteorite studies: terrestrial and extraterrestrial applications, 1991 [1991, eng] **E-47990**
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Paleomagnetism of the Late Cretaceous and Early Tertiary rocks from Fildes Peninsula, West Antarctica, and its geotectonic significance [1992, eng] **E-49022**
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- Lux, D.R.**
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- Luyendyk, B.P.**
Geological and geophysical investigations in the northern Ford Ranges, Marie Byrd Land, West Antarctica [1991, eng] **E-47565**
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Organisation and funding of the Australian antarctic program [1993, eng] **A-48731**
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Alluvial stratigraphic sequences within the Permian Transantarctic foreland basin, Beardmore Glacier area, Antarctica [1991, eng] **E-47553**
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Global fractionation and cold condensation of low volatility organochlorine compounds in polar regions [1993, eng] **B-48146**
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Benthic foraminiferal assemblages from the eastern South Atlantic Polar Front region between 35 deg and 57 deg S: distribution, ecology and fossilization potential [1993, eng] **B-48857**
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Geochemistry of Cenozoic ash layers from the Kerguelen Plateau (Leg 120): a first step toward a tephrostratigraphy of the southern Indian Ocean [1992, eng] **E-47973**
DeltaC-13 in benthic foraminiferal tests of *Fontbotia wuellerstorfi* (Schwager) relative to the *deltaC-13* of dissolved inorganic carbon in southern ocean deep water: implications for glacial ocean circulation models [1993, eng] **J-49487**
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Isotopic evidence for reduced productivity in the glacial southern ocean [1993, eng] **E-49185**
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Eocene-Oligocene faunal turnover in planktic foraminifera, and antarctic glaciation [1992, eng] **E-48287**
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- Macqueen, A.D.**
Ice cores: a bibliography [1992, eng] **A-48272**
- Madureira, L.S.P.**
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- Mae, S.**
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MOS-1 multi-sensor data set and sea ice study [1991, eng] **F-48317**
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Newly developed snow vehicle (SM100S) for Antarctica. 4. Low temperature properties of crawler belt [1992, jpn] **G-48314**
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- Magiera, U.**
Lissarca notorcadensis (Bivalvia: Phyllobryidae) living on *Notocidaris* sp. (Echinoidea: Cidaridae): population dynamics in limited space [1993, eng] **B-48251**
- Maione, M.**
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- Makarov, O.V.**
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BIOMASS and Soviet investigations in the Antarctic (mainly on antarctic krill, *Euphausia superba* Dana) [1992, eng] **B-49148**
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- Makita, K.**
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- Malin, M.C.**
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Seasonal changes of antarctic marine bacterioplankton [1991, eng] **B-47777**
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- Mamani, M.**
Critical review of magnetotelluric studies in diverse tectonic areas in Argentina, Chile and Antarctica [1992, eng] **L-48717**
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Modern particle flux and productivity in Andvord Bay, Antarctica [1992, eng] **J-48026**
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Century-scale effects of increased atmospheric CO₂ on the ocean-atmosphere system [1993, eng] **I-48723**
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- Mancini, E.**
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Failure of the National Science Foundation to protect Antarctica [1992, eng] **B-48666**
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Interhemispheric comparison of the development of the stratospheric polar vortex during fall: a 3-dimensional perspective for 1991-1992 [1993, eng] **I-49130**
Evolution of ozone observed by UARS MLS in the 1992 late winter southern polar vortex [1993, eng] **I-49131**
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Age of charnockitic gneiss from Mount Vechernyaya, Thala Hills, near Molodezhnaya Station, East Antarctica [1991, eng] **E-47570**
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- Manzoni, M.**
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- Maracci, G.**
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Occurrence of *Rhincalanus gigas*, *Calanoides acutus*, and *Calanus propinquus* (Copepoda: Calanoida) in late May in the area of the Antarctic Peninsula [1993, eng] **B-48323**
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Why explore Antarctica? Australian discussions in the 1880s [1992, eng] **A-49443**
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Potential vorticity constraints on the dynamics and hydrography of the southern ocean [1993, eng] **J-48373**
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MHD pulsed generators in Antarctica—man-made production of magnetospheric substorms, and underground surveying: proposals and perspectives [1992, eng] **K-47414**
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Survey and new measurements of ice vapor pressure at temperatures between 170 and 250K [1993, eng] **I-48539**
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Hydrology of Lake Glubokoye, King George I., winter 1987 [1991, rus] **E-47587**
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- Martin, S.**
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Respiratory electron transport activity of microplankton in the Weddell Sea during early spring: influence of the ice cover and the ice edge [1992, eng] **B-47463**
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Temporal and spatial variations of phytoplankton from Boeckella Lake (Hope Bay, Antarctic Peninsula) [1993, eng] **B-48435**
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Stratigraphy and sedimentology of the Whiteout Conglomerate; an upper Paleozoic glacigenic unit, Ellsworth Mountains, West Antarctica [1992, eng] **E-48061**
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Carbon isotopic compositions in antarctic carbonaceous chondrites [1993, eng] **E-48995**
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Zooplankton data collected with BIOMASS Programme at Syowa Station in 1984 by JARE-25 [1992, eng] **B-48007**
- Matsuki, M.**
Population ecology and satellite telemetry of Weddell seals (*Leptonychotes weddellii*) in McMurdo Sound [1991, eng] **B-47860**
- Matsumoto, G.I.**
Sterols and fatty acids in foams from antarctic lakes of the Dry Valleys in south Victoria Land [1985, eng] **B-47852**
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Frost heave and creep in the Sör Rondane Mountains, Antarctica [1992, eng] **E-47605**
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Sensitivity experiment of ocean general circulation model—responses for wind stress (first report) [1991, jpn] **J-48302**
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Comparison of low-frequency pulsations in electron precipitation and magnetic fields at South Pole Station [1991, eng] **K-48780**
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DSIR's stratospheric trace gas programme in Antarctica [1992, eng] **I-47804**
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Structural field observations in the basement between Fry and Reeves Glaciers, Victoria Land, Antarctica [1992, eng] **E-47826**
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1991 EUROMET micrometeorite collection at Cap-Prudhomme, Antarctica [1992, eng] **E-47736**
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- May, S.E.**
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Hydrocarbon contamination on the Antarctic Peninsula. I. Arthur Harbor-subtidal sediments [1992, eng] **E-47712**

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Hydrocarbon contamination on the Antarctic Peninsula. I. Arthur Harbor-subtidal sediments [1992, eng] **E-47712**

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Greenhouse gas-induced climate change simulated with the CCC second-generation general circulation model [1992, eng] **I-47441**

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Distribution of enteric bacteria in antarctic seawater surrounding the sewage outfall at McMurdo Station [1991, eng] **B-48791**

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Distribution of enteric bacteria in antarctic seawater surrounding a sewage outfall [1993, eng] **J-48450**

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Global change implications for antarctic lakes [1993, eng] **F-48534**

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Summertime along-valley wind variations in the Wright Valley, Antarctica [1992, eng] **I-47738**

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Evaluation for the New Zealand region and Antarctica of candidate models for the IGRF series [1992, eng] **K-47935**

McMeekin, T.A.

Direct sequencing of the polymerase chain reaction-amplified 16S rRNA gene of *Flavobacterium gondwanense* sp. nov. and *Flavobacterium salegens* sp. nov., two new species from a hypersaline antarctic lake [1993, eng] **B-48034**

Polyunsaturated fatty acids in antarctic bacteria [1993, eng] **B-48437**

Phylogeny of the antarctic bacterium, *Carnobacterium alterfunditum* [1993, eng] **B-49232**

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Summer phytoplankton succession in Ellis Fjord, eastern Antarctica [1993, eng] **B-48980**

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Fourier transform infrared studies of the interactions of HCl with model polar stratospheric cloud films [1993, eng] **I-48560**

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Ozone depletion at northern and southern latitudes derived from January 1979 to December 1991 Total Ozone Mapping Spectrometer data [1993, eng] **I-49041**

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Phytoplankton production and biomass at frontal zones in the Atlantic sector of the southern ocean [1993, eng] **B-49228**

Marine productivity enhancement around Bouvet and the South Sandwich Islands (Southern Ocean) [1992, eng] **J-47603**

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Primary productivity of acrylic acid and dimethyl sulfide during a summer bloom of *Phaeocystis pouchetii* in antarctic coastal water [1992, chi] **J-47430**

Meadows, J.

Environmental management in Antarctica: a guide to the literature resources [1992, eng] **B-47520**

Environmental management in Antarctica: instruments and institutions [1992, eng] **M-48664**

Meana, E.

Supply and storage of fuel in the Spanish antarctic base Juan Carlos I [1993, eng] **G-48931**

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Generation mechanisms of quasi-stationary waves in the Southern Hemisphere [1992, eng] **I-47950**

Planetary-scale disturbances in the southern stratosphere during early winter [1992, eng] **I-47959**

Medica, D.

Italian Antarctic Expedition 1989-90: preliminary observations on particulate organic matter [1990, eng] **J-49202**

- Medvedev, N.D.**
Earth magnetic pole secular drift caused by precession of the planet's inner core and magnetic center [1991, rus] **L-47599**
- Meehan, R.T.**
Immunology presentation at the 1990 NASA/NSF Antarctica Biomedical Science Working Group [1990, eng] **H-48464**
- Mehl, K.W.**
Composition and origin of marine ash layers and epiclastic rocks from the Kerguelen Plateau, southern Indian Ocean (Legs 119 and 120) [1992, eng] **E-47972**
- Mehlum, F.**
Aspects of the breeding biology of the antarctic petrel *Thalassoica antarctica* and the krill requirement of the chicks, at Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land [1991, eng] **B-47881**
Notes on the south polar skua *Catharacta Maccormicki* breeding at Svarthamaren in Mühlig-Hofmannfjella, Dronning Maud Land [1991, eng] **B-47882**
- Melander, O.**
Swedish Antarctic Research Programme 1991/92; a cruise report [1992, eng] **A-47601**
Proceedings of the Fifth Symposium on Antarctic Logistics and Operations, San Carlos de Bariloche, Argentina, 8 to 10 June 1992 [1993, eng] **G-48921**
- Melles, M.**
Composition and paleoenvironmental implications of sediments in a fresh water lake and in marine basins of Bunger Hills, Antarctica [1992, eng] **E-47740**
Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica [1993, eng] **E-48433**
Sub-bottom profiling and sedimentological studies in the southern Weddell Sea, Antarctica: evidence for large-scale erosional/depositional processes [1993, eng] **E-48827**
- Mellor, M.**
Notes on Antarctic aviation [1993, eng] **G-49482**
- Melnikov, I.A.**
Ecology of sea ice biota. 1. Habitat, terminology, and methodology [1992, eng] **B-47478**
Ecology of sea ice biota. 2. Global significance [1992, eng] **B-47479**
- Melnikov, Y.S.**
Account of the results of investigations on board the Soviet research vessels *Skif* and *Kalper* in waters of the Kerguelen Is. for the period of Feb. 1987-Apr. 1988 [1993, eng] **B-48491**
- Meloni, A.**
Daily geomagnetic variation observed at Terra Nova Bay during 1986-90 summer expeditions [1992, eng] **K-47416**
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- Meloni, P.**
Non cosine response of optics in the evaluation of bi-hemispherical reflectance of antarctic surfaces [1992, eng] **I-47398**
- Menashi, J.D.**
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- Men'shenina, L.L.**
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Interannual variations of krill larvae abundance in the Scotia Sea [1992, rus] **B-48880**
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- Mensing, T.M.**
High-titanium basalt and dolerite clasts from the Elephant and Reckling moraines [1991, eng] **E-47560**
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Keratinophilic fungi isolated from antarctic soil [1991, eng] **B-47644**
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- Mergenthaler, J.L.**
CLAES observations of ClONO₂ and HNO₃ in the antarctic stratosphere, between June 15 and September 17, 1992 [1993, eng] **I-49126**
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- Merry, C.J.**
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- Meyer-Berthaud, B.**
Reconstructing the Gondwana seed fern *Dicroidium*: Evidence from the Triassic of Antarctica [1992, eng] **E-47420**
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Eocene crinoids from Seymour Island, Antarctic Peninsula: paleobiogeographic and paleoecologic implications [1993, eng] **E-48137**
- Meyer, M.A.**
Long-term productivity in the cryptoendolithic microbial community of the Ross Desert, Antarctica [1993, eng] **B-48336**
- Meyer, M.C.**
Some leeches (Hirudinea: Piscicolidae) of the southern oceans [1990, eng] **B-48407**
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Aerogeophysical investigations over the Bowers Mountains, north Victoria Land, Antarctica [1992, eng] **L-47839**
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Pu-244-Xe formation and gas retention age, exposure history, and terrestrial ages of angrites LEW86010 and LEW87051: comparison with Angra dos Reis [1991, eng] **E-47380**
- Middlebrook, A.M.**
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- Midya, D.**
Effect of antarctic O₃ decline on night airglow intensity of Na5893Å, O55-77Å, OH emissions and its correlation with total solar flare numbers [1993, eng] **K-48862**
- Midya, S.K.**
Effect of antarctic O₃ decline on night airglow intensity of Na5893Å, O55-77Å, OH emissions and its correlation with total solar flare numbers [1993, eng] **K-48862**
- Mielke, T.A.**
Siple Station, Antarctica, experiments on staircase frequency ramps as approximations to continuous ramps [1993, eng] **K-48451**
- Mikhailovskii, G.E.**
Influence of upwelling in southern gyres and in the Antarctic Divergence on plankton communities [1992, rus] **J-48877**
- Mikhalsky, E.V.**
Association of dolerite and lamprophyre dykes, Jetty Peninsula (Prince Charles Mountains, East Antarctica) [1993, eng] **E-49015**
- Millar, I.L.**
Pre-Cenozoic magmatic history of the Thurston Island crustal block, West Antarctica [1993, eng] **E-48812**
- Miller, C.A.**
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- Miller, D.G.M.**
Conservation of antarctic marine living resources: a review and South African perspective [1991, eng] **B-48894**
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Impact of BIOMASS-related research on South African antarctic science [1992, eng] **B-49146**
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- Miller, G.D.**
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Foraging flexibility of Adélie penguins *Pygoscelis adeliae*: consequences for an indicator species [1993, eng] **B-48240**

Miller, H.

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Filchner-Ronne Ice Shelf programme, Report No.5 (1991) [1991, eng] **F-48984**

Physical properties of the marine ice under the Filchner-Ronne-Schelfeis: some preliminary results [1991, eng] **F-48987**

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Middle Eocene to Oligocene stable isotopes, climate, and deep-water history: the terminal Eocene event? [1992, eng] **E-48286**

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Contrasts in coverage: an examination of the polar bibliographic data bases on the NISC Arctic and Antarctic Regions CD-ROM [1992, eng] **A-47516**

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Preliminary results of the isotopic and chemical investigation of the 214 m ice core from the Ronne Ice Shelf, Antarctica. (Extended summary) [1991, eng] **F-48988**

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Tectonic evolution of the Indian Ocean triple junction, Anomaly 6 to present [1993, eng] **E-48018**

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Geochemistry and petrology of a suite of ten Yamato HED meteorites [1993, eng] **E-48700**

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Multielemental characterization of aerosol at Terra Nova Bay. Preliminary results on the fine component during the 1990-91 austral summer [1992, eng] **I-47795**

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Noble gases and Kr-81 terrestrial age of Asuka 881757 lunar meteorite [1993, eng] **E-48689**

Noble gases in the unique meteorites Yamato-74063 and -74357 [1993, eng] **E-48692**

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C-14 terrestrial ages of nine antarctic meteorites using CO and CO₂ temperature extractions [1993, eng] **E-48706**

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Global climate of September-November 1990: ENSO-like warming in the western Pacific and strong ozone depletion over Antarctica [1993, eng] **I-48975**

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Fire beneath the ice [1993, eng] **E-47714**

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Marine molluscan constraints on the age of Cretaceous fossil forests of Alexander Island, Antarctica [1992, eng] **E-47573**

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Montgomery, J.C.

Under-ice observations of fish behavior at McMurdo Sound [1991, eng] **B-47541**

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Microzooplankton populations' temporal trend in Terra Nova Bay (austral summer 1989/90) [1992, eng] **B-49396**

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Geochemistry of Cenozoic ash layers from the Kerguelen Plateau (Leg 120): a first step toward a tephrostratigraphy of the southern Indian Ocean [1992, eng] **E-47973**
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- Morescalchi, A.**
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- Morescalchi, M.A.**
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Contribution of Antarctic Peninsula ice to sea level rise. Report for the Commission of the European Communities Project EPOC-CT90-0015 [1992, eng] **F-49203**
- Morris, E.M.**
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- Muñoz M., G.**
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Comparison of krill (*Euphausia superba*) density estimates using 38 and 120 kHz echosounders [1993, eng] **B-48797**
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Mineralogy and petrology of the CK chondrites Yamato-82104, Yamato-693 and a Carlisle-Lakes-type chondrite Yamato-82002 [1993, eng] **E-48695**
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- Naraoka, H.**
Analyses of carboxylic acids and hydrocarbons in antarctic carbonaceous chondrites, Yamato-74662 and Yamato-793321 [1989, eng] **E-47851**
Asuka-87 and Asuka-88 collections of antarctic meteorites: search, discoveries, initial processing, and preliminary identification and classification [1993, eng] **E-48693**
Carbon isotopic compositions in antarctic carbonaceous chondrites [1993, eng] **E-48995**
- Nascimbene de Dumont, N.**
Tourism within the Antarctic Treaty System [1992, spa] **A-48588**
Antarctic Treaty System and the United Nations [1992, spa] **M-48568**
- Nasu, K.**
Japanese activities for BIOMASS [1992, eng] **B-49144**
- Navarro, R.**
Estimated food consumption by penguins at the Prince Edward Islands [1993, eng] **B-49009**
- Neale, P.J.**
Variation of the fluorescence quantum yield in relation to photosynthesis by phytoplankton from perennially ice-covered Lake Bonney [1991, eng] **B-48206**
- Neelov, A.V.**
Fish of Admiralty Bay (King George Island, South Shetland Islands, Antarctica) [1992, eng] **B-47481**
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On the influence of stratospheric stability on lower tropospheric circulations over the South Pole [1992, eng] **I-47947**
Synoptic influence on inversion winds at the South Pole [1992, eng] **I-47951**
- Nell, P.A.R.**
Mesozoic radiolarian faunas from the Antarctic Peninsula: age, tectonic and palaeoceanographic significance [1992, eng] **E-49195**
- Nelson, D.D., Jr.**
OH reaction kinetics and atmospheric lifetimes of CF₃CFHCF₃ and CF₃CH₂Br [1993, eng] **I-48107**
- Nelson, D.M.**
Silica cycle in the antarctic ocean: is the Weddell Sea atypical [1993, eng] **J-48727**
- Nelson, E.P.**
Temporal and spatial variations in the southern Patagonian batholith; constraints on magmatic arc development [1991, eng] **E-48113**
- Neonen, K.**
Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica [1993, eng] **E-48830**
- New Zealand Antarctic Society**
Antarctic, Vol.12, No.6 [1991, eng] **A-47504**
Antarctic, Vol.12, No.10 [1992, eng] **A-48017**
Antarctic, Vol.12, No.9 [1992, eng] **A-48308**
Antarctic, Vol.12, No.11-12 [1993, eng] **A-48403**

- Antarctic, Vol.13, No.1 [1993, eng] **A-48445**
- New Zealand. Department of Scientific and Industrial Research. Antarctic Division**
- Antarctic field manual, 1991 [1991, eng] **A-49285**
- New Zealand Antarctic Research Programme, 1991/92 [1991, eng] **A-49286**
- Antarctic operations manual, 1991 [1991, eng] **A-49287**
- New Zealand. Ministry of External Relations and Trade**
- New Zealand Antarctic Programme 1992/93 [1992, eng] **A-47503**
- New Zealand. Ministry of External Relations and Trade. NZAP**
- Antarctic operations manual [1992, eng] **A-49288**
- Antarctic field manual [1992, eng] **A-49306**
- Antarctic first aid manual [1992, eng] **H-49305**
- New Zealand. Ministry of Foreign Affairs and Trade. NZAP**
- Antarctic field manual [1993, eng] **A-49199**
- Antarctic operations manual [1993, eng] **A-49200**
- New Zealand Antarctic Programme 1993/94 [1993, eng] **A-49201**
- Antarctic first aid manual [1993, eng] **H-49198**
- Ngan, P.V.**
- Chromosomes of the antarctic amphipod *Waldeckia obesa* Chevreux [1993, eng] **B-49153**
- Ni, Z.H.**
- Studies on gravity tides in King George Island, Antarctica [1993, eng] **J-48762**
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- Comparison of antarctic petrel (*Thalassoica antarctica*) diets with net samples of antarctic krill (*Euphausia superba*) taken from the Prydz Bay region [1993, eng] **B-49115**
- Nichol, S.E.**
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- Total ozone measurements from Scott Base, Antarctica with a Dobson and a Brewer spectrophotometer [1992, eng] **I-47813**
- Intercomparison of total ozone measured at low sun angles by the Brewer and Dobson spectrophotometers at Scott Base, Antarctica [1993, eng] **I-49444**
- Nicholls, K.W.**
- Extending the antarctic meteorological record using ice-sheet temperature profiles [1993, eng] **F-47987**
- Radar absorption due to impurities in antarctic ice [1993, eng] **F-48712**
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- Impurity concentrations inferred from radio echo sounding [1991, eng] **F-48993**
- Nichols, D.S.**
- Polyunsaturated fatty acids in antarctic bacteria [1993, eng] **B-48437**
- Fatty acid, sterol and hydrocarbon composition of antarctic sea ice diatom communities during the spring bloom in McMurdo Sound [1993, eng] **B-49012**
- Nichols, P.D.**
- Polyunsaturated fatty acids in antarctic bacteria [1993, eng] **B-48437**
- Unsaturated diether phospholipids in the antarctic methanogen *Methanococcoides burtonii* [1992, eng] **B-48510**
- Nearshore benthic marine sediments [1993, eng] **B-48745**
- Fatty acid, sterol and hydrocarbon composition of antarctic sea ice diatom communities during the spring bloom in McMurdo Sound [1993, eng] **B-49012**
- Hydrocarbon and coprostanol levels in seawater, sea-ice algae and sediments near Davis Station in eastern Antarctica: a regional survey and preliminary results for a field fuel spill experiment [1992, eng] **J-48673**
- Nicol, S.**
- Ecosystem management and the antarctic krill [1993, eng] **B-47745**
- Growth and shrinkage of antarctic krill *Euphausia superba* from the Indian Ocean sector of the southern ocean during summer [1992, eng] **B-47914**
- Chitin production by krill [1993, eng] **B-48810**
- Nicolaus, B.**
- Isolation of extremely halotolerant cocci from Antarctica [1992, eng] **B-47884**
- Niedermann, S.**
- Pu-244-Xe formation and gas retention age, exposure history, and terrestrial ages of angrites LEW86010 and LEW87051: comparison with Angra dos Reis [1991, eng] **E-47380**
- Nielsen, C.J.**
- On the adsorption of NO and NO₂ on cold H₂O/H₂SO₄ surfaces [1993, eng] **I-49124**
- Niemeyer, S.**
- Anthropogenic lead in antarctic sea water [1993, eng] **J-49092**
- Nienow, J.A.**
- Long-term productivity in the cryptoendolithic microbial community of the Ross Desert, Antarctica [1993, eng] **B-48336**
- Terrestrial lithophytic (rock) communities [1993, eng] **B-48749**
- Nieuwland, G.**
- Biogenic particles and nano/picoplankton in water masses over the Scotia-Weddell Sea Confluence, Antarctica [1992, eng] **J-47456**
- Nikolaev, V.I.**
- Isotopic pleiad of oxygen in atmospheric precipitation in the polar regions [1991, rus] **J-48101**
- Nikolenko, A.V.**
- Studies of the relationship of thermophysical properties of ice to hydrostatic pressure and temperature [1991, rus] **F-48100**
- NIPR Symposium on Antarctic Meteorites, 17th, Tokyo, Aug. 19-21, 1992**
- Proceedings of the NIPR Symposium on Antarctic Meteorites, No.6 [1993, eng] **E-48684**
- NIPR Symposium on Polar Biology, 14th, Tokyo, Dec. 4-5, 1991**
- Proceedings of the NIPR Symposium on Polar Biology, No.6 [1993, eng] **B-48601**
- NIPR Symposium on Polar Meteorology and Glaciology, 14th, Tokyo, July 9-10, 1991**
- Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6 [1992, eng] **F-48179**
- NIPR Symposium on Upper Atmosphere Physics, 15th, Tokyo, Jan. 28-29, 1992**
- Proceedings of the NIPR Symposium on Upper Atmosphere Physics, No.6 [1993, eng] **K-48516**
- Nishi, J.M.**
- Chemical weathering of Cu, Fe, and Pb sulfides, southern Ellsworth Mountains, West Antarctica [1992, eng] **E-48079**
- Nishiizumi, K.**
- Terrestrial ages of antarctic meteorites [1991, eng] **E-47991**
- Nishino, M.**
- Initial observation results with imaging riometer at Ny-Alesund (L=16) [1993, eng] **K-48521**
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- MOS-1 multi-sensor data set and sea ice study [1991, eng] **F-48317**
- Disintegrating ice front of Shirase Glacier, East Antarctica [1993, eng] **F-49301**
- Undulating topography on the antarctic ice sheet revealed by NOAA AVHRR images [1993, eng] **F-49407**
- Niven, B.S.**
- Logical synthesis of environment of King Penguin, *Aptenodytes patagonicus* [1991, eng] **B-47845**
- Nixon, P.A.**
- Trace metals in Vanda Lake in Antarctica [1992, eng] **E-47856**
- Noda, K.**
- Heavy metal distribution in Weddell seals (*Leptonychotes weddellii*) from the Antarctic during JARE-32 [1993, eng] **B-48605**
- Noguchi, K.**
- Oceanographic data of the 32nd Japanese Antarctic Research Expedition from November 1990 to March 1991 [1993, eng] **J-48410**
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- Petrology and mineralogy of CK chondrites: implications for the metamorphism of the CK chondrite parent body [1993, eng] **E-48697**
- Nolan, C.P.**
- Growth in the bivalve *Yoldia eightsi* at Signy Island, Antarctica, determined from internal shell increments and calcium-45 incorporation [1993, eng] **B-49388**
- Noordeloos, A.A.M.**
- Strategies and kinetics of photoacclimation in three antarctic nanophytoflagellates [1993, eng] **B-49151**
- Nordhausen, W.**
- AMLR program: Horizontal separation of larval and adult *Thysanoessa macrura* around Elephant Island, Antarctica, during the 1991 austral summer [1991, eng] **B-47863**
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- Environmental impacts of station development in the Larsemann Hills, Princess Elizabeth Land, Antarctica [1992, eng] **B-48243**
- Foods of the south polar skua *Catharacta maccormicki* in the eastern Larsemann Hills, Princess Elizabeth Land, East Antarctica [1993, eng] **B-48632**
- Normant, E.**
- Constraints on the repetitivity of the orbit of an altimetric satellite: estimation of the cross-track slope [1993, eng] **C-48459**
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- Effects of antarctic sea ice biota on seeding as studied in aquarium experiments [1992, eng] **B-47469**

- Nöthig, E.M.**
Diatom genus *Proboscía* in antarctic waters [1991, eng] **B-47435**
- Novick, A.N.**
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- Nowlin, W.D., Jr.**
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- Nozaki, H.**
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Records of radio aurora at Syowa Station, Antarctica in 1991 [1993, eng] **K-48513**
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New species of the genus *Brookula* collected by the icebreaker *Shirase* from Breid Bay, Antarctica (Gastropoda: Cyclostrematidae) [1991, eng] **B-49196**
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On processes determining the vertical stability of surface waters in the marginal ice zone of the northwestern Weddell Sea and their relationship with phytoplankton bloom development [1992, eng] **J-47458**
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Influence of the Tethys on the bottom waters of the Early Tertiary ocean [1992, eng] **J-47765**
- Obremski, J.S.**
Observation of recurrent temperature lapse near the surface at the South Pole [1988, eng] **I-48553**
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Field energy expenditures of the Southern Giant-Petrel [1992, eng] **B-47574**
- Ocone, R.**
Interaction of gravity driven flows at Nansen Ice Sheet [1992, eng] **I-47399**
Statistical analysis of katabatic winds near Terra Nova Bay Station, 1987-1988 [1991, ita] **I-47687**
Sodar data obtained with a three-axis Doppler system at Terra Nova Bay in 1987-1988 [1991, ita] **I-47691**
Acoustic sounder experimentation in Victoria Land, Antarctica [1991, eng] **I-47728**
Sodar observations of the antarctic boundary layer in a deglaciated area: preliminary results [1991, eng] **I-47729**
- Oerlemans, J.**
Possible changes in the mass balance of the Greenland and antarctic ice sheets and their effects on sea level [1993, eng] **F-49475**
Ice shelves and icebergs—an overview [1989, eng] **F-49496**
Atmospheric model for simulating the mass balance and temperature on the antarctic ice sheet [1990, eng] **I-48388**
- Oerter, H.**
Sea salt dependent electrical conduction in polar ice [1992, eng] **F-47844**
Origin of green icebergs in Antarctica [1992, eng] **F-47939**
Dynamics of ice shelves and their sensitivity to changing mass-balance quantities: model results for Filchner-Ronne Ice Shelf, Antarctica [1990, eng] **F-48389**
Filchner-Ronne Ice Shelf programme, Report No.5 (1991) [1991, eng] **F-48984**
Physical properties of the marine ice under the Filchner-Ronne-Schelfeis: some preliminary results [1991, eng] **F-48987**
Filchner-Ronne Ice Shelf programme, Report No.6 (1992) [1992, eng] **F-49063**
Textural characteristics of the core B13 from the Ronne Ice Shelf and the textural evolution of deforming ice [1992, eng] **F-49068**
Filchner IV campaign and the 320 m deep ice core B15 [1992, eng] **F-49072**
- Oeschger, H.**
Working hypotheses for glaciation/deglaciation mechanisms [1992, eng] **F-48104**
Information on the history of atmospheric CO₂ and the carbon cycle from ice cores [1989, eng] **I-49055**
- Ogawa, F.**
Observation and analysis of the tidal gravity variations at Asuka Station located on the antarctic ice sheet [1993, eng] **L-48542**
- Oglesby, R.J.**
Application of equilibrium climate models to questions of glaciation at high latitudes [1990, eng] **F-48136**
- GCM study of antarctic glaciation [1989, eng] **I-49494**
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New insight of possible correlation between the Lützow- Holm Bay granulites (East Antarctica) and the Sri Lankan granulites [1992, eng] **E-49240**
- Ogura, K.**
Ghost images of auroral X ray sources observed by directional balloon-borne detectors [1989, eng] **K-49384**
- Oh, J.H.**
Logistic activities for the operation and maintenance of King Sejong Station [1992, kor] **G-48169**
- Oh, J.K.**
Depositional processes of diatomaceous sediments in King George Basin, Bransfield Strait, Antarctica: sedimentary record of small-scale climate change [1992, kor] **E-48165**
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On the vertical profiles of long wave radiation at Syowa Station in Antarctica [1992, eng] **I-48184**
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Nonlinear wave-wave interactions in the subauroral ionosphere on the basis of the ISIS-2 satellite observations of Siple Station VLF signals [1993, eng] **K-48545**
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Seasonal variations of the flow and oceanic structure under fast ice in Lützow-Holm Bay, Antarctica [1993, eng] **J-49300**
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Data transfer system using a multi-ID ARGOS transmitter for the antarctic Polar Patrol Balloon experiment [1992, jpn] **I-48310**
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Granulites and garnet-cordierite gneisses from Dronning Maud Land, Antarctica [1993, eng] **E-49221**
- Ohtaka, K.**
Long term variations of radio auroral activity [1993, eng] **K-48519**
- Ohtake, T.**
Freezing points of H₂SO₄ aqueous solutions and formation of polar stratospheric clouds [1992, eng] **I-47910**
Freezing points of H₂SO₄ aqueous solutions and formation of stratospheric ice clouds [1993, eng] **I-48379**
- Ohtani, S.**
Biogeochemical features of hydrocarbons in cyanobacterial mats from the McMurdo Dry Valleys, Antarctica [1993, eng] **B-48606**
Gonium sociale (Volvocales, Chlorophyta) from Antarctica [1992, eng] **B-49473**
- Ohyama, Y.**
Antarctic Tardigrada III. Fildes Peninsula of King George Island [1993, eng] **B-48610**
Unstable cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* during the austral summer at King George Island. (Extended abstract) [1993, eng] **B-48615**
Plectus antarcticus de Man, 1904 and *P. frigophilus* Kirjanova, 1958 (Nematoda: Plectidae), with emphasis on the male, from the Soya Coast, East Antarctica [1991, eng] **B-49194**
Variation in summer cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* from contrasting habitats on King George Island [1992, eng] **B-49211**
- Ojakangas, R.W.**
Stratigraphy and sedimentology of the Whiteout Conglomerate; an upper Paleozoic glacial unit, Ellsworth Mountains, West Antarctica [1992, eng] **E-48061**
- Oji, T.**
Eocene crinoids from Seymour Island, Antarctic Peninsula: paleobiogeographic and paleoecologic implications [1993, eng] **E-48137**
- Okada, H.**
Chromosome study on the submerged moss collected from antarctic lakes [1993, eng] **B-48608**
- Okutani, T.**
New species of the genus *Brookula* collected by the icebreaker *Shirase* from Breid Bay, Antarctica (Gastropoda: Cyclostrematidae) [1991, eng] **B-49196**
- Olbers, D.**
Potential vorticity constraints on the dynamics and hydrography of the southern ocean [1993, eng] **J-48373**
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Four new species of *Caloplaca* from Antarctica [1993, eng] **B-49351**
- Olf, J.**
Wind forcing and ice motion in the Weddell Sea region [1992, eng] **F-47774**

- Oliver, R.L.**
Geology of the Bunger Hills area, Antarctica: implications for Gondwana correlations [1993, eng] **E-47906**
- Oliveri López, A.M.**
Convention on the Conservation of Antarctic Marine Living Resources [1992, spa] **M-48576**
- Oltmans, S.J.**
Study of polar stratospheric clouds at the South Pole [1991, eng] **I-48213**
Simultaneous ozone and polar stratospheric cloud observations at South Pole Station during winter and spring 1991 [1993, eng] **I-49040**
- Ondoh, T.**
Nonlinear wave-wave interactions in the subauroral ionosphere on the basis of the ISIS-2 satellite observations of Siple Station VLF signals [1993, eng] **K-48545**
- Ondrejlik, D.**
Antarctic tabular iceberg A-24 movement and decay via satellite remote sensing [1993, eng] **F-49088**
- O'Neill, A.**
Planetary-scale disturbances in the southern stratosphere during early winter [1992, eng] **I-47959**
Rapid descent of mesospheric air into the stratospheric polar vortex [1993, eng] **I-49129**
- Ono, K.**
Data transfer system using a multi-1D ARGOS transmitter for the antarctic Polar Patrol Balloon experiment [1992, jpn] **I-48310**
- Ono, T.**
Upper atmosphere physics data, Syowa and Asuka Stations, 1990 [1993, eng] **K-48512**
Derivation of energy parameters of precipitating auroral electrons by using the intensity ratios of auroral emissions [1993, eng] **K-49386**
Data catalogue in World Data Center C2 for Aurora, No.4 [1993, eng] **K-49497**
- Onstott, R.G.**
Sea ice altimetry [1992, eng] **F-48192**
- Opeskin, B.R.**
Australia's territorial sea: international and federal implications of its extension to 12 miles [1991, eng] **M-48200**
- Orange, A.**
Thelidium austroatlanticum (Verrucariaceae), a new species from the South Orkney Islands [1993, eng] **B-49352**
- Orensanz, J.M.**
Eunicemorph polychaete annelids from antarctic and subantarctic seas—with addenda to the Eunicemorpha of Argentina, Chile, New Zealand, Australia and the southern ocean [1990, eng] **B-48405**
- Öresland, V.**
Summer and winter diet of four carnivorous copepod species around South Georgia [1993, eng] **B-48959**
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Studies through Jutulgryta, Fimbulisen in the 1991/92 season [1992, eng] **F-49083**
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Geomorphological and glaciological research during the 2nd P.N.R.A. expedition to Terra Nova Bay, 1986-1987 [1991, ita] **E-47666**
Holocene raised beaches of Terra Nova Bay [1991, ita] **E-47670**
- Orsi, A.H.**
On the circulation and stratification of the Weddell Gyre [1993, eng] **J-48392**
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Volcanic observations on Scott Island in the antarctic ocean [1992, eng] **E-47819**
Volcanic geology of Edmonson Point, Mt. Melbourne volcanic field, north Victoria Land, Antarctica [1992, eng] **E-47820**
- Orsini, S.**
Correlating the auroral activity with the southern high-latitude O₃-content [1992, eng] **I-47814**
- Osanai, Y.**
Metamorphic evolution of the Sör Rondane Mountains, East Antarctica [1992, eng] **E-49235**
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Conservation of living resources and environmental protection [1992, spa] **M-48584**
- Overhoff, A.**
Life cycle of the microbivorous antarctic Dry Valley nematode *Scottinema lindsayae* (Timm 1971) [1993, eng] **B-48328**
- Owen, J.**
Melatonin suppression in human subjects by bright and dim light in Antarctica: time and season-dependent effects [1992, eng] **H-47705**
- Owens, N.J.P.**
Ocean-climate studies in the Antarctic [1993, eng] **J-49484**
- Oyarzún G., M.**
Respiratory symptoms and pulmonary function in personnel of Bernardo O'Higgins Station [1993, spa] **H-48820**
- Ozaki, H.**
Distribution of REEs in HCL/HNO₃-residues of antarctic UOCs and its implications to their metamorphic geneses on UOC parent bodies [1992, eng] **E-49313**
- Ozaki, M.**
Theory of current generator in the magnetosphere-ionosphere coupling [1993, eng] **K-48522**
- Paech, H.J.**
Overview of antarctic research by the DDR, 1959-1990 [1992, ger] **A-47741**
- Pakhomov, E.A.**
Feeding and estimation of daily ration of Wilson's glassfish, *Chaenodraco wilsoni*, of the Indian Ocean sector of Antarctica [1992, eng] **B-48130**
Macroplankton of waters surrounding the Kerguelen Is. [1993, eng] **B-48488**
- Palangio, P.**
Daily geomagnetic variation observed at Terra Nova Bay during 1986-90 summer expeditions [1992, eng] **K-47416**
- Palermi, S.**
Stratospheric GCM for polar ozone studies: a progress report [1992, eng] **I-47411**
- Palinkas, L.A.**
Stress, coping, and depression in U.S. Antarctic Program personnel [1991, eng] **H-48211**
Going to extremes: the cultural context of stress, illness and coping in Antarctica [1992, eng] **H-48461**
- Palme, H.**
Ca-,Al-rich inclusions in the unique chondrite ALH85085: petrology, chemistry, and isotopic compositions [1993, eng] **E-48805**
- Palmer, J.**
Morphology and tectonics of the Australian-Antarctic Discordance between 123E and 128E [1993, eng] **E-48823**
- Palmer-Julson, A.**
Sediment microfabric and physical properties record of Late Neogene Polar Front migration, Site 751 [1992, eng] **E-47975**
- Palmisano, A.C.**
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Daily geomagnetic variation observed at Terra Nova Bay during 1986-90 summer expeditions [1992, eng] **K-47416**
- Paltridge, G.**
Antarctica—the last frontier for climate modelling [1992, eng] **A-48032**
- Pan, C.X.**
Unstable cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* during the austral summer at King George Island. (Extended abstract) [1993, eng] **B-48615**
Variation in summer cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* from contrasting habitats on King George Island [1992, eng] **B-49211**
- Pane, L.**
Contribution to the study of copepods collected during the Italian oceanographic campaign in Antarctica 1989-90 [1992, eng] **B-49397**
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- Pangia, M.**
Three-axial sonic anemometer-thermometer measurements in the Terra Nova Bay: some preliminary results [1992, eng] **I-47790**
- Pankhurst, R.J.**
Pre-Cenozoic magmatic history of the Thurston Island crustal block, West Antarctica [1993, eng] **E-48812**
Geochemistry of Palaeozoic-Mesozoic Pacific rim orogenic magmatism, Thurston Island area, West Antarctica [1993, eng] **E-49014**
- Pansegrouw, H.M.**
Ranging behaviour of southern elephant seal cows from Marion Island [1992, eng] **B-48244**

- Pant, N.C.**
Granites of Petermann Ranges, East Antarctica and implications on their genesis [1991, eng] **E-47491**
Comment on the paper "Granites of Peterman Ranges, East Antarctica and implications on their genesis," and Reply [1992, eng] **E-49192**
- Papitashvili, V.O.**
Comparison between two corrected geomagnetic coordinate systems at high latitudes [1992, eng] **L-48395**
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Long period pulsation events in electron precipitation and magnetic fields at the South Pole [1992, eng] **K-48526**
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- Paren, J.G.**
Sea salt dependent electrical conduction in polar ice [1992, eng] **F-47844**
Extending the antarctic meteorological record using ice-sheet temperature profiles [1993, eng] **F-47987**
Antarctic Peninsula contribution to future sea level rise [1993, eng] **F-49476**
- Parfit, M.**
Reclaiming a lost antarctic base [1993, eng] **A-47731**
- Parimoo, M.L.**
Granites of Petermann Ranges, East Antarctica and implications on their genesis [1991, eng] **E-47491**
Comment on the paper "Granites of Peterman Ranges, East Antarctica and implications on their genesis," and Reply [1992, eng] **E-49192**
- Parish, T.R.**
On the role of antarctic katabatic winds in forcing large-scale tropospheric motions [1992, eng] **I-47384**
Numerical simulation of katabatic winds crossing the Siple Coast area of West Antarctica [1992, eng] **I-47956**
On the interaction between the katabatic wind regime and large-scale tropospheric forcing near Adelie Land, Antarctica [1992, eng] **I-47957**
Present-day antarctic climatology of the NCAR Community Climate Model Version 1 [1993, eng] **I-48089**
Automatic weather station observations of strong katabatic winds near Terra Nova Bay, Antarctica [1991, eng] **I-48221**
Numerical simulation of antarctic drainage flows [1988, eng] **I-48548**
Interaction of katabatic flow with local thermal effects in a coastal region of Adélie Land, East Antarctica [1993, eng] **I-48559**
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- Park, B.K.**
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- Reiprich, S.**
Magnetic investigations of the Ekström Ice Shelf, Antarctica [1992, eng] **F-48825**
- Reitehaug, P.I.**
Norwegian Antarctic Research Expedition 1989-90—medical contingency, work and research [1991, nor] **H-47485**
- Reitmayr, G.**
Gravity surveys of the Mount Melbourne and the Rennick-Lillie Glacier areas, north Victoria Land, Antarctica [1992, eng] **L-47840**
- Remy, F.**
Constraints on the repetitivity of the orbit of an altimetric satellite: estimation of the cross-track slope [1993, eng] **C-48459**
Precise altimetric topography in ice-sheet flow studies [1993, eng] **F-49417**
Katabatic wind intensity and direction over Antarctica derived from scatterometer data [1992, eng] **I-48148**
- Renard, R.J.**
Statistical approach to prediction of restricted visibility at McMurdo and Williams Field, Antarctica [1988, eng] **I-48554**

- Repetski, J.E.**
Cambrian conodonts from the Springer Peak and Minaret Formations, Ellsworth Mountains, West Antarctica [1992, eng] **E-48066**
- Rester, A.C.**
GRAD supernova observer: first flight of a very large balloon over Antarctica [1993, eng] **K-47709**
- Retzlaff, R.N.**
Analysis of radar studies on the Siple Coast [1991, eng] **F-47993**
- Reznikov, A.E.**
Investigations of the lower ionosphere over Antarctica via ELF-VLF radio waves [1993, eng] **K-47909**
- Ribie, C.A.**
Does prey preference affect habitat choice in antarctic seabirds [1992, eng] **B-48050**
- Riea, A.H.**
Antarctica. A human odyssey confirming a hypothesis [1992, cat] **C-48956**
- Riceardi, A.C.**
Western South America and Antarctica [1992, eng] **E-49224**
- Rieci, C.A.**
Naming of igneous and metamorphic rock units in Antarctica: recommendation by the SCAR Working Group on Geology [1993, eng] **E-47907**
- Rieci, F.**
Study on Ross Sea copepods [1992, eng] **B-49399**
- Richard, S.M.**
Geological and geophysical investigations in the northern Ford Ranges, Marie Byrd Land, West Antarctica [1991, eng] **E-47565**
Glacial flow reorientation in the southwestern Fosdick Mountains, Ford Ranges, Marie Byrd Land [1991, eng] **F-47996**
- Riechez, V.C.**
Transantarctica: traversing the last continent [1990, fre] **A-47629**
- Rieker, R.W.**
Taxonomy and biogeography of Macquarie Island seaweeds [1987, eng] **B-47492**
- Ridley, J.K.**
Antarctic ice sheet topography mapped with the ERS-1 radar altimeter [1993, eng] **C-48948**
Validating the UK-PAF land ice product surface elevation [1993, eng] **F-48654**
Densely spaced radar altimeter coverage of antarctic ice shelves [1991, eng] **F-48994**
Results from a validation campaign for the ERS-1 radar altimeter on the Filchner-Ronne Ice Shelf, Antarctica [1992, eng] **F-49080**
Climate signals from SSM/I observations of marginal ice shelves [1993, eng] **F-49416**
- Ridoux, V.**
Seasonal importance of oceanic myctophids in King Penguin diet at Crozet Islands [1993, eng] **B-48919**
- Rieck, H.J.**
Late Neogene antarctic glacio-eustatic record, Victoria Land Basin margin, Antarctica [1992, eng] **F-47771**
- Riedel, B.**
Strain and velocity determination on Ronne Ice Shelf [1992, eng] **F-49074**
- Riedel, F.**
Limacosphera, an unusual mesogastropod (Lamelliariidae) larva of the Weddell Sea (Antarctica) [1993, eng] **B-48476**
- Riemann, F.**
Thraustochytrid protists in antarctic fast ice? [1993, eng] **B-49013**
- Rinaldi, C.A.**
Scientific activity in Antarctica [1992, spa] **A-48574**
Antarctic non-renewable resources [1992, spa] **A-48582**
Technical means used in Antarctica [1992, spa] **G-48575**
- Risebrough, R.W.**
Chemical change in Antarctica—significance? A perspective [1992, eng] **B-48661**
- Ritchie, A.**
Crossopterygian fishes from the Devonian of Antarctica: systematics, relationships and biogeographic significance [1992, eng] **B-48178**
- Ritter, B.**
Strain and velocity determination on Ronne Ice Shelf [1992, eng] **F-49074**
Trigonometric leveling 1992 on Ronne Ice Shelf [1992, eng] **F-49075**
- Rivera O., A.**
Krill population biology during the 1991 Chilean antarctic krill fishery [1993, eng] **B-49375**
- Rivkin, R.B.**
Dynamics of bacterioplankton growth in McMurdo Sound, Antarctica: evidence for substrate sufficient growth [1991, eng] **B-47527**
Ingestion of phytoplankton by polar and temperate echinoderm larvae [1991, eng] **B-47533**
- Rivolier, J.**
International Biomedical Expedition to the Antarctic [1991, fre] **H-48296**
Systemic study of a wintering group on Kerguelen Is. [1991, fre] **H-48821**
- Rizi, V.**
Formation and growth of PSCs in a 2D model: effects on the secular ozone trend [1992, eng] **I-47810**
- Robert, C.**
Late Eocene-Early Oligocene evolution of climate and marine circulation: deep-sea clay mineral evidence [1992, eng] **E-47761**
Paleoceanographic and paleoclimatic evolution in the Weddell Sea (Antarctica) during Middle Eocene-Late Oligocene, from a coarse sediment fraction and clay mineral data (ODP Site 689) [1993, eng] **E-49277**
- Roberts, C.A.**
Review of COMNAP/SCALOP accomplishments [1993, eng] **B-48922**
- Roberts, J.P.**
Tooth growth in male antarctic fur seals (*Arctocephalus gazella*) from South Georgia: an indicator of long-term growth history [1993, eng] **B-48155**
- Roberts, N.J.**
Sampling volatile organics from a meromictic antarctic lake [1993, eng] **B-48920**
- Robin, J.P.**
Comparative fuel metabolism in Gentoo and King penguins: adaptation to brief versus prolonged fasting [1993, eng] **B-48633**
- Robineau, D.**
Cetaceans sighted on board the ships *Skif* and *Kalper* (Feb.-Apr. 1988) [1993, fre] **B-48498**
- Robinson, A.V.**
Direct oceanographic observations from under the Rutford flowline, Ronne Ice Shelf [1991, eng] **F-48989**
Preliminary results from hot water drilling and oceanographic measurements under Ronne Ice Shelf [1992, eng] **F-49071**
- Robinson, C.**
Temperature and antarctic plankton community respiration [1993, eng] **B-49350**
- Robinson, D.H.**
High resolution study of the platelet ice ecosystem in McMurdo Sound, Antarctica: photosynthetic and bio-optical characteristics of a dense microalgal bloom [1993, eng] **B-48960**
- Robinson, K.**
Method for preparing large numbers of otolith sections for viewing by scanning electron microscope [1993, eng] **B-49432**
- Robisson, P.**
Natural history of Ross Sea emperor penguin colonies [1991, eng] **B-47858**
- Robotham V., H.**
Iterative model to construct an age/length key to assess the age composition of a new fishery for *Dissostichus eleginoides* in Chile [1993, spa] **B-49364**
- Roccatagliata, D.**
Diastylopsis goeckei, a new species (Crustacea: Cumacea: Diastylidae) from antarctic waters [1992, eng] **B-48951**
- Rocha Passos, M.J. de A.C.**
Chromosomes of the antarctic amphipod *Waldeckia obesa* Chevreux [1993, eng] **B-49153**
- Roche, A.E.**
CLAES observations of ClONO₂ and HNO₃ in the antarctic stratosphere, between June 15 and September 17, 1992 [1993, eng] **I-49126**
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- Roche-Mayzaud, O.**
Medium term time acclimation of feeding and digestive enzyme activity in marine copepods: influence of food concentration and copepod species [1992, eng] **B-47916**
- Roda, C.**
Geophysical exploration of the periantarctic marine platform [1991, ita] **L-47674**
- Rodhouse, P.G.**
Trophic relations of the cephalopod *Martialia hyadesi* (Teuthoidea: Ommastrephidae) at the Antarctic Polar Front, Scotia Sea [1992, eng] **B-47577**

- Early life cycle of cephalopods in relation to the major oceanographic features of the southwest Atlantic Ocean [1992, eng] **B-47915**
- Cephalopod prey of the southern elephant seal, *Mirounga leonina* L. [1992, eng] **B-48964**
- Cephalopod prey of the black-browed albatross *Diomedea melanophrys* at South Georgia [1993, eng] **B-49112**
- Genetic evidence of population heterogeneity and cryptic speciation in the ommastrephid squid *Martialia hyadesi* from the Patagonian Shelf and Antarctic Polar Frontal Zone [1993, eng] **B-49178**
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Blood constituents and electrophoretic patterns in antarctic birds: penguins and skuas [1993, eng] **B-48052**
- Rodwell, S.**
Moult in Black-browed and Grey-headed albatrosses *Diomedea melanophrys* and *D. chrysostoma* [1993, eng] **B-48424**
- Rohardt, G.**
Winter distribution and overwintering strategies of the antarctic copepod species *Calanoides acutus*, *Rhincalanus gigas* and *Calanus propinquus* (Crustacea, Calanoida) in the Weddell Sea [1993, eng] **B-48917**
- Antarctic Coastal Current in the southeastern Weddell Sea [1992, eng] **J-47450**
- 47W Transect: oceanography, suspended matter, and distribution of silicate and ammonium [1991, eng] **J-47662**
- Rohde, H.F.**
Snowdrift around buildings for antarctic environment [1992, eng] **F-48047**
- Modelling of snowdrift around prismatic buildings for antarctic environment [1992, eng] **G-48558**
- Romanelli, M.**
Age structure of *Chionodraco hamatus* (Teleostei, Channichthyidae) samples caught in Terra Nova Bay, East Antarctica [1992, eng] **B-49214**
- Romano, M.**
Primary structure and functional properties of Hb 1 of the antarctic nototheniid *Trematomus newnesi* [1991, eng] **B-47638**
- Romanov, A.A.**
Minimum and maximum drift ice extent in the southern ocean in 1991 [1992, eng] **F-49154**
- Romanov, M.IU.**
Hydrological fronts of the southern ocean, summer 1988-1989 [1992, rus] **J-48875**
- Romeo, G.**
Daily geomagnetic variation observed at Terra Nova Bay during 1986-90 summer expeditions [1992, eng] **K-47416**
- Geomagnetic measurements during the Italian Antarctic Expedition in 1986-1987 [1991, ita] **L-47667**
- Ronveaux, D.**
Low salinity frazil ice generation at the base of a small antarctic ice shelf [1993, eng] **F-49016**
- Rosa, R.**
Blood constituents and electrophoretic patterns in antarctic birds: penguins and skuas [1993, eng] **B-48052**
- Rosas, M.A.**
Antarctic mites *Neocalvolia* n.sp. from Robert I. [1993, spa] **B-48831**
- Roschin, E.A.**
Variation of the size structure of *Champscephalus gunnari* in Kerguelen waters, 1987-1988 [1993, fre] **B-48493**
- Roscoe, H.K.**
Equilibrium constant of NO₂ with N₂O₄ and the temperature dependence of the visible spectrum of NO₂: a critical review and implications for measurements of NO₂ in the polar stratosphere [1993, eng] **I-48350**
- Rosen, J.M.**
Study of polar stratospheric clouds at the South Pole [1991, eng] **I-48213**
- Simultaneous ozone and polar stratospheric cloud observations at South Pole Station during winter and spring 1991 [1993, eng] **I-49040**
- Rosenberg, J.E.**
U.S. AMLR program: 1990-1991 field season activities [1991, eng] **B-47861**
- Rosenberg, T.J.**
Imaging riometer measurements of F-region electron density structures [1991, eng] **K-48781**
- Rosenfield, J.E.**
Radiative feedback of polar stratospheric clouds on antarctic temperatures [1993, eng] **I-49125**
- Roser, D.J.**
Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: microbial biomass distribution [1993, eng] **B-48204**
- Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: some observations on methods for measuring soil biomass in ornithogenic soils [1993, eng] **B-48205**
- Roskov, E.G.**
Brief information report on the 21st cruise of R/V *Skif* in shelf waters of Kerguelen Islands, fulfilled in accordance with joint Soviet-French programme (January-May 1987) [1993, eng] **B-48480**
- Ross, H.**
Potential vorticity constraints on the dynamics and hydrography of the southern ocean [1993, eng] **J-48373**
- Ross, M.I.**
Evidence from the antarctic continental margin of Late Paleogene ice sheets: a manifestation of plate reorganization and synchronous changes in atmospheric circulation over the emerging southern ocean? [1992, eng] **E-48285**
- Ross, R.M.**
Long-term ecological research strategy for polar environmental research [1992, eng] **B-48663**
- Rossetti, P.**
Geology of crystal basement rocks of Victoria Land [1991, ita] **E-47676**
- Rossi, A.**
Meteorite finds by EUROMET near Frontier Mountain, north Victoria Land, Antarctica [1993, eng] **E-48400**
- Rossi, L.**
South-Pole: the Italian system for antarctic data exchange [1992, eng] **A-47401**
- South Pole: a progress report on the Italian system for antarctic data exchange [1992, eng] **A-47802**
- Rossow, W.B.**
Polar cloudiness: some results from ISCCP and other cloud climatologies [1992, eng] **I-47941**
- Roth, J.**
Natural thermoluminescence of meteorites and paleo-ice movement at the Lewis Cliff blue ice field [1991, eng] **E-47989**
- Roth, R.**
Wind forcing and ice motion in the Weddell Sea region [1992, eng] **F-47774**
- Rothery, P.**
Effectiveness of various cattle ear tags as markers for Weddell seals [1992, eng] **B-47489**
- Factors causing the limitation of growth of terrestrial algae in maritime Antarctica during late summer [1992, eng] **B-47620**
- Ice nucleation studies of two beetles from sub-antarctic South Georgia [1993, eng] **B-48254**
- Moult in Black-browed and Grey-headed albatrosses *Diomedea melanophrys* and *D. chrysostoma* [1993, eng] **B-48424**
- Characterizing supercooling point distributions [1992, eng] **B-49233**
- Effect of maternal age and experience on egg-size and hatching success in Wandering Albatrosses *Diomedea exulans* [1992, eng] **B-49260**
- Primary colonization by microalgae in relation to spatial variation in edaphic factors on antarctic fellfield soils [1993, eng] **B-49433**
- Rothrock, D.**
Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**
- Rothwell, D.R.**
Antarctic Treaty: 1961-1991 and beyond [1992, eng] **M-48198**
- Australia's territorial sea: international and federal implications of its extension to 12 miles [1991, eng] **M-48200**
- Australian law in Antarctica [1993, eng] **M-48729**
- Rott, H.**
Signatures of antarctic firn by means of ERS-1 AMI and by field measurements [1993, eng] **F-48648**
- Active and passive microwave signatures of antarctic firn by means of field measurements and satellite data [1993, eng] **F-49426**
- Rouland, D.**
New technology in seismological studies on Adélie Coast [1990, fre] **L-48274**
- Röv, N.**
Density of breeding and non-breeding antarctic petrels at Svarthamaren, Dronning Maud Land, 1990 [1991, eng] **B-47883**
- Rowe-Rowe, D.T.**
Density, body size, and reproduction of feral house mice on Gough Island [1992, eng] **B-47853**

- Rowell, A.J.**
Sea-level fluctuations and the evolution of a Middle Cambrian carbonate ramp in the Neptune Range [1991, eng] **E-47569**
Brachiopods, archaeocyathids, and Pelmatozoa from the Minaret Formation of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48068**
- Rowley, P.D.**
Plutonic rocks of the English Coast and northern Behrendt Mountains, eastern Ellsworth Land, Antarctica [1991, eng] **E-47566**
- Rubilar, P.S.**
Remarks on the natural mortality of *Dissostichus eleginoides* in Subarea 48.3 [1993, spa] **B-49365**
- Rubin, A.E.**
Compositional classification of chondrites: V. The Karoonda (CK) group of carbonaceous chondrites [1991, eng] **E-47379**
- Rubinshtein, I.G.**
Some characteristics of the distribution of bottom fauna on the northern Kerguelen ridge [1992, eng] **B-48153**
- Rucklidge, J.C.**
C-14 terrestrial ages of nine antarctic meteorites using CO and CO₂ temperature extractions [1993, eng] **E-48706**
- Rudels, B.**
High latitude ocean convection [1993, eng] **J-48845**
- Rudge, C.**
1988/89 New Zealand Antarctic Research Programme review [1989, eng] **A-47911**
- Ruggiero, F.H.**
Experimental studies of clouds and aerosols along the antarctic coast [1988, eng] **I-48550**
- Russell, J.M., III**
HALOE antarctic observations in the spring of 1991 [1993, eng] **I-48544**
Halogen Occultation Experiment [1993, eng] **I-48562**
Stratospheric dryness: antiphased desiccation over Micronesia and Antarctica [1993, eng] **I-49127**
Comparison of observed (HALOE) and modeled (CCM2) methane and stratospheric water vapor [1993, eng] **I-49134**
- Russell, S.**
New significance for antarctic biological collections and taxonomic research [1993, eng] **B-48611**
- Russian Committee on Antarctic Research**
Report to SCAR No.34, 1992, on the Russian antarctic scientific activities. I. Record of activities Apr. 1, 1991-Mar. 31, 1992. II. Planned activities Apr. 1, 1992-Mar. 31, 1993 [1993, eng] **A-49326**
- Rutford, R.H.**
Breccia bodies in deformed Cambrian limestones, Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48075**
Glacial history of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48078**
- Ruth, S.**
Modeled latitudinal distribution of the ozone quasi-biennial oscillation using observed equatorial winds [1993, eng] **I-49450**
- Ruzicka, J.J.**
Techniques for retrospective analyses of environmental conditions influencing the early life history on antarctic fishes [1991, eng] **B-47542**
- Ryan, J.P.**
Coastal zone color scanner pigment concentrations in the southern ocean and relationships to geophysical surface features [1993, eng] **J-48041**
- Ryan, K.R.**
Laboratory measurements of the loss of ClO on Pyrex, ice and NAT at 183 K [1993, eng] **I-48106**
- Ryan, P.G.**
Radiocarbon dates of snow petrel regurgitations can reveal exposure periods for nunataks in Antarctica [1992, eng] **B-48246**
- Ryland, J.S.**
Taxonomy of six antarctic anascan Bryozoa [1993, eng] **B-48434**
- Saastad, O.W.**
On the adsorption of NO and NO₂ on cold H₂O/H₂SO₄ surfaces [1993, eng] **I-49124**
- Sabella, S.J.**
Upon closer inspection... [1992, eng] **M-48667**
- Sadler, P.**
Establishment of greenhouses at the United States McMurdo and South Pole stations [1993, eng] **G-48938**
- Sadovskii, N.A.**
Rifting, ozone layer and the level of the world ocean [1992, rus] **I-48304**
- Safronov, V.A.**
Procedure for collecting, processing and transmitting aerometeorological information from antarctic stations and research vessels [1991, rus] **I-47586**
- Saggiomo, V.**
Primary production in the Straits of Magellan [1991, eng] **B-49036**
- Sahurie, E.J.**
International Law of Antarctica [1991, eng] **M-49290**
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Mineralogical studies of lunar meteorite Yamato-793169, a mare basalt [1993, eng] **E-48685**
- Saito, K.**
Paleomagnetic and Ar-40/Ar-39 dating studies of the Mawson charnockite and some rocks from the Christensen Coast [1992, eng] **E-49243**
- Saito, M.**
Newly developed snow vehicle (SM100S) for Antarctica. 5. Result of general performance tests [1992, jpn] **G-48315**
- Sakui, S.**
Newly developed snow vehicle (SM100S) for Antarctica. 3. Low temperature toughness of the welded joints of the structural steel [1992, jpn] **G-48313**
- Salamolard, M.**
Foraging strategies of Wandering Albatrosses through the breeding season: a study using satellite telemetry [1993, eng] **B-49345**
- Salters, V.J.M.**
Trace element and isotopic characteristics of Kerguelen-Heard Plateau basalts [1992, eng] **E-47965**
Zeolite-facies metamorphism of central Kerguelen Plateau basalts [1992, eng] **E-47966**
- Saltzman, E.S.**
Methanesulfonic acid and non-seasalt sulfate in the Vostok ice core: a glacial/interglacial record of biogenic sulfur emissions from the southern ocean [1991, eng] **F-48005**
- Salvini, F.**
Geological features of central Victoria Land [1991, ita] **E-47669**
Multispectral calibration of satellite image geologic interpretation in Victoria Land [1991, ita] **E-47671**
- Samoilov, O.IU.**
Air inclusions as an index of ice formation conditions on polar glaciers [1991, rus] **F-48102**
- Samson, J.A.**
Observation of recurrent temperature lapse near the surface at the South Pole [1988, eng] **I-48553**
- SANARP Team**
Autumn cruise to Antarctica [1993, eng] **D-48801**
- Sancho, L.G.**
Lichen colonization of recent moraines on Livingston Island (South Shetland I., Antarctica) [1993, eng] **B-48629**
- Sandee, A.J.J.**
Uric acid production and degradation in an Adélie penguin rookery at Admiralty Bay, King George I. [1992, eng] **B-49160**
- Sanders, R.W.**
Increased chlorine dioxide over Antarctica caused by volcanic aerosols from Mount Pinatubo [1993, eng] **I-48348**
Visible and near-ultraviolet spectroscopy at McMurdo Station, Antarctica. 9. Observations of OClO from April to October 1991 [1993, eng] **I-48469**
- Sandford, S.A.**
1984-1985 antarctic search for meteorites (ANSMET) field program [1992, eng] **E-48139**
Mid-infrared transmission spectra of antarctic ureilites [1993, eng] **E-49314**
- Sanides, S.**
El Dorado for astronomers [1993, ger] **K-49308**
- Santachiara, G.**
Individual particle analysis of antarctic aerosols [1992, eng] **I-47395**
- Santiago de Chile. Instituto Antártico Chileno**
Boletín antártico chileno, Vol.11, No.2 [1992, spa] **A-47925**
Boletín antártico chileno, Vol.10, No.2 [1991, spa] **A-48085**
Boletín antártico chileno, Vol.12, No.2 [1993, spa] **A-49459**
Boletín antártico chileno, Vol.12, No.1 [1993, spa] **A-49464**
- Santosh, M.**
Petrologic and fluid inclusion study of charnockites from the Lützow-Holm Bay region, East Antarctica: evidence for fluid-rich metamorphism in the lower crust [1992, eng] **E-48449**
- Sarà, M.**
Biogeographic traits and checklist of antarctic demosponges [1992, eng] **B-47618**

- Sarao, R.**
Mesoscale meteorology at Terra Nova Bay Station: operational aspects and some climatological results [1992, eng] **I-47387**
Some climatological aspects in the Terra Nova Bay area, Antarctica [1992, eng] **I-47791**
- Sarmiento, J.L.**
Atmospheric carbon dioxide and the ocean [1993, eng] **I-49093**
- Sarrazin, F.**
Foraging strategies of Wandering Albatrosses through the breeding season: a study using satellite telemetry [1993, eng] **B-49345**
- Sasaki, H.**
Report on Japan-Australia collaborative research on marine biology in the Prydz Bay area, Antarctica in 1992 [1993, jpn] **B-48621**
- Sato, N.**
Statistical characteristics of the polarization of Pc1 micropulsations at high latitudes [1992, eng] **K-47934**
Statistical study on the conjugacy of geomagnetic field variations [1993, jpn] **K-48616**
- Saunders, P.M.**
Transport, heat, and freshwater fluxes within a diagnostic numerical model (FRAM) [1993, eng] **J-48372**
- Savage, M.L.**
Southern Oscillation signal in Antarctica [1988, eng] **I-48552**
- Savchenko, V.G.**
Effect of a meridional profile of surfaces on the characteristics of large-scale atmospheric waves [1992, rus] **I-48467**
- Savoie, D.L.**
Nitrogen and sulfur species in antarctic aerosols at Mawson, Palmer Station, and Marsh (King George Island) [1993, eng] **I-49001**
- Saxena, V.K.**
Experimental studies of clouds and aerosols along the antarctic coast [1988, eng] **I-48550**
- Sayers, J.**
Oil spill prevention and response [1993, eng] **G-48929**
Oil spill response in Antarctica [1993, eng] **G-48936**
- Scambos, T.A.**
Feature maps of ice streams C, D, and E, West Antarctica [1991, eng] **C-48787**
Application of image cross-correlation to the measurement of glacier velocity using satellite image data [1992, eng] **F-48016**
Complex ice stream flow revealed by sequential satellite imagery [1993, eng] **F-49415**
- Scammacca, B.**
Benthic algal flora of Terra Nova Bay (Ross Sea, Antarctica) [1992, eng] **B-49319**
- Scarabel, L.R.**
Distribution of photoautotrophic picoplankton in Terra Nova Bay, summer 1989-1990 [1993, fre] **B-48828**
- Scarano, G.**
Study of a new waste water treatment plant for the Italian antarctic station [1993, eng] **G-48939**
- Scarponi, G.**
Lead contamination of seawaters with different anthropic influence [1991, eng] **J-47615**
- Schalk, P.H.**
Acoustic observations on krill spring-summer migration and patchiness in the northern Weddell Sea [1992, eng] **B-47461**
Clio piatkowski, a mesopelagic pteropod new to science (Gastropoda, Opisthobranchia) [1992, eng] **B-49320**
- Schatz, G.S.**
Environmental regulation in the Antarctic [1992, eng] **M-49469**
- Schaumann, K.**
Thraustochytrid protists in antarctic fast ice? [1993, eng] **B-49013**
- Schenke, H.W.**
Height reference base of Filchner-Ronne Ice Shelf and Weddell Sea by ERS-1 radar altimetry [1992, eng] **F-49078**
- Scherer, R.P.**
Diatom paleoproductivity and sediment transport in west antarctic basins and the Neogene history of the West Antarctic Ice sheet (WAIS) [1992, eng] **E-47755**
- Schiano, M.E.**
Atmospheric turbidity in Antarctica [1991, ita] **I-47680**
- Schinner, G.O.**
Structural characteristics of marsupial brood pouches of the antarctic sea urchins *Abatus nimrodi* and *Abatus shackletoni* (Echinoidea: Spatangoida) [1993, eng] **B-48949**
- Schirmer, U.**
Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data [1993, eng] **F-48650**
- Schlesinger, M.E.**
Model projections of CO₂-induced equilibrium climate change [1993, eng] **F-49477**
- Schlich, R.**
Geologic and tectonic evolution of the Kerguelen Plateau: an introduction of the scientific results of Leg 120 [1992, eng] **E-47963**
- Schmalzl, J.**
Dynamics of subcritical double-diffusive convection in the southern ocean: an application to polynyas [1993, eng] **J-48846**
- Schmidt-Gröttrup, M.**
Air-sea-ice interactions in the Weddell Sea [1993, eng] **F-48653**
- Schmiedl, G.**
Benthic foraminiferal assemblages from the eastern South Atlantic Polar Front region between 35 deg and 57 deg S: distribution, ecology and fossilization potential [1993, eng] **B-48857**
Character of clasts in glaciomarine sediments as an indicator of transport and depositional processes, Weddell and Lazarev Seas, Antarctica [1993, eng] **E-48433**
- Schmincke, H.U.**
Composition and origin of marine ash layers and epiclastic rocks from the Kerguelen Plateau, southern Indian Ocean (Legs 119 and 120) [1992, eng] **E-47972**
- Schnack-Schiel, S.B.**
Occurrence of *Rhincalanus gigas*, *Calanoides acutus*, and *Calanus propinquus* (Copepoda: Calanoida) in late May in the area of the Antarctic Peninsula [1993, eng] **B-48323**
Contributions of the Federal Republic of Germany to the BIOMASS Program [1992, eng] **B-49142**
- Schneider, O.**
Geomagnetic perturbations in the southern polar cap [1992, eng] **K-47512**
- Schreiber, A.**
Blood proteins in bipolar Priapulida [1992, eng] **B-47627**
- Schroeter, B.**
History of Granite House and the western geological party of Scott's *Terra Nova* expedition [1993, eng] **A-48730**
- Schulze, P.**
Petrogenesis of the metamorphic basement complex of the central Heimefront Range (western Queen Maud Land, Antarctica) [1992, ger] **E-47743**
- Schuster, J.**
Cosmic background radiation anisotropy at degree angular scales: further results from the South Pole [1993, eng] **K-49437**
- Schutt, J.**
Annual ablation rates of the Lewis Cliff ice tongue [1991, eng] **F-48004**
- Schutt, J.W.**
Antarctic search for meteorites, 1990-1991 field season [1991, eng] **E-47988**
- Schwarz, A.M.J.**
Terrestrial vegetation at Canada Glacier, southern Victoria Land, Antarctica [1992, eng] **B-47475**
Invertebrates associated with moss communities at Canada Glacier, southern Victoria Land, Antarctica [1993, eng] **B-48329**
- Schwarzkopf, M.D.**
Radiative forcing of climate from halocarbon-induced global stratospheric ozone loss [1992, eng] **I-47609**
- Scientific Committee for the Conservation of Antarctic Marine Living Resources**
Selected scientific papers 1992 [1993, eng] **B-49362**
- Scientific Committee on Antarctic Research**
SCAR report No.9, Aug. 1992 [1992, eng] **A-47960**
SCAR bulletin No.108, January 1993 [1993, eng] **A-48013**
SCAR bulletin No.109, April 1993 [1993, eng] **A-48343**
SCAR bulletin No.111, Oct. 1993 [1993, eng] **A-49220**
SCAR bulletin No.110, July 1993 [1993, eng] **B-48737**
- Scott, C.J.**
Nimbus-7 Total Ozone Mapping Spectrometer (TOMS) antarctic ozone atlas: August through November 1991 [1992, eng] **I-48511**
- Scott, E.N.**
Human infectious diseases [1993, eng] **H-48754**
- Scott, E.R.D.**
Shock metamorphism of carbonaceous chondrites [1992, eng] **E-48344**
- Scott, F.J.**
Uptake of sub-micrometre particles and dissolved organic material by antarctic choanoflagellates [1993, eng] **B-48053**
- Scourfield, M.W.J.**
SANAE total column ozone: 1980 to 1990 [1991, eng] **I-48907**

- Scourfield, M.W.J.** (*cont.*)
 Natural ozone depletion over Antarctica [1991, eng] **I-48908**
 Ozone depletion over the polar caps caused by solar protons [1992, eng] **K-48097**
 SANAE: the Durban connection [1991, eng] **K-48905**
- Seach, S.A.**
 Conflicting interests in Antarctica: people or nature? Who decides? [1991, eng] **M-48199**
- Sears, D.W.G.**
 Natural thermoluminescence of meteorites and paleo-ice movement at the Lewis Cliff blue ice field [1991, eng] **E-47989**
 Natural thermoluminescence of meteorites. 5. Ordinary chondrites at the Allan Hills ice fields [1993, eng] **E-48019**
 Breakup and structure of an *H*-chondrite parent body: the *H*-chondrite flux over the last million years [1993, eng] **E-49490**
- Sears, H.**
 Natural thermoluminescence of meteorites and paleo-ice movement at the Lewis Cliff blue ice field [1991, eng] **E-47989**
 Natural thermoluminescence of meteorites. 5. Ordinary chondrites at the Allan Hills ice fields [1993, eng] **E-48019**
- Seeber, G.**
 Height reference base of Filchner-Ronne Ice Shelf and Weddell Sea by ERS-1 radar altimetry [1992, eng] **F-49078**
- Segawa, J.**
 Determination of the gravity field around Antarctica using satellite altimeter data and surface gravity data—A review of the recent studies [1992, eng] **L-49245**
- Sei, T.**
 Growth rate of polyhedral ice crystals growing from the vapor phase and their habit change [1989, eng] **F-48351**
- Seiderer, L.J.**
 Chitin digestion and assimilation by seabirds [1992, eng] **B-49344**
- Seki, T.**
 Newly developed snow vehicle (SM100S) for Antarctica. 5. Result of general performance tests [1992, jpn] **G-48315**
- Seko, K.**
 Disintegrating ice front of Shirase Glacier, East Antarctica [1993, eng] **F-49301**
 Undulating topography on the antarctic ice sheet revealed by NOAA AVHRR images [1993, eng] **F-49407**
- Selkirk, J.M.**
 Serpentinite, harzburgite, and vegetation on subantarctic Macquarie Island [1993, eng] **B-49251**
- Semelkina, A.N.**
 Development of zooplankton in the Kerguelen Is. area in 1987 and 1988 [1993, eng] **B-48487**
- Sempéré, J.C.**
 Morphology and tectonics of the Australian-Antarctic Discordance between 123E and 128E [1993, eng] **E-48823**
- Senft, D.C.**
 Lidar measurements of the middle atmosphere at South Pole [1991, eng] **I-48214**
- Senior, C.A.**
 Response of antarctic climate in general circulation model experiments with transiently increasing carbon dioxide concentrations [1992, eng] **I-48259**
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 Stabilization of snow temperature in Dronning Maud Land, Antarctica, January 1989 [1992, eng] **F-48600**
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 Terrestrial vegetation at Canada Glacier, southern Victoria Land, Antarctica [1992, eng] **B-47475**
 Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: microbial biomass distribution [1993, eng] **B-48204**
 Microbiology of ornithogenic soils from the Windmill Islands, Budd Coast, continental Antarctica: some observations on methods for measuring soil biomass in ornithogenic soils [1993, eng] **B-48205**
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 Snow algae of the Windmill Islands, continental Antarctica. 2. *Chloromonas rubroleosa* sp.nov. (Volvocales, Chlorophyta), an alga of red snow [1993, eng] **B-49187**
 Serpentinite, harzburgite, and vegetation on subantarctic Macquarie Island [1993, eng] **B-49251**
- Sevigny, J.H.**
 Trace element and isotopic characteristics of Kerguelen-Heard Plateau basalts [1992, eng] **E-47965**
 Zeolite-facies metamorphism of central Kerguelen Plateau basalts [1992, eng] **E-47966**
- Sharma, P.**
 Terrestrial ages of antarctic meteorites [1991, eng] **E-47991**
- Sharp, T.R.**
 Rates of primary production and growth for phytoplankton in Lake Bonney [1991, eng] **B-47878**
- Shatilo, A.I.**
 Influence of repeated wintering-over in Antarctica on cardiovascular diseases in personnel [1991, rus] **H-47593**
- Shaughnessy, P.**
 Feeding ecology of southern fur seals (*Arctocephalus* spp.) and their management at Heard and Macquarie Islands. (Extended abstract) [1993, eng] **B-48613**
- Shchepkin, L.A.**
 Peculiarities of the spatial distribution of some characteristics of the thermosphere and ionosphere above Antarctica [1992, eng] **K-48759**
- Shears, J.R.**
 Abandoned stations and field huts—The British approach to management [1993, eng] **A-48923**
- Sheehan, D.D.**
 Comparison of altimetry profiles over East Antarctica from Seasat and Geosat: an interim report [1990, eng] **F-48386**
- Shemesh, A.**
 Isotopic evidence for reduced productivity in the glacial southern ocean [1993, eng] **E-49185**
- Shen, Y.B.**
 Discussion on stratigraphic subdivision and nomenclature in Fildes Peninsula, King George Island, Antarctica [1992, chi] **E-47428**
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 Non-marine Late Cretaceous depositional unit on King George Island, West Antarctica [1992, eng] **E-49019**
- Sheng, Z.Z.**
 Anomalous xenon isotopes in the antarctic carbonaceous chondrite Belgica [1986, eng] **E-47855**
- Shepherd, B.S.**
 Techniques for retrospective analyses of environmental conditions influencing the early life history on antarctic fishes [1991, eng] **B-47542**
- Sheppard, I.**
 Differences in temperature and conductivity between the east and west lobes of Lake Bonney: evidence for circulation within and between lobes [1991, eng] **E-47876**
- Sheraton, J.W.**
 Geology of the Bunger Hills area, Antarctica: implications for Gondwana correlations [1993, eng] **E-47906**
 Zircon ages and the distribution of Archaean and Proterozoic rocks in the Rauer Islands [1993, eng] **E-48441**
 Association of dolerite and lamprophyre dykes, Jetty Peninsula (Prince Charles Mountains, East Antarctica) [1993, eng] **E-49015**
- Shergold, J.H.**
 Late Dresbachian (Idamean) and other trilobite faunas from the Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48065**
- Shi, G.Y.**
 Antarctic total ozone change correlated to the stratosphere wind and temperature during the polar night [1992, chi] **I-47431**
- Shibata, S.**
 Results of ozonesonde observations at Syowa Station in 1990 [1992, eng] **I-48183**
- Shibuya, K.**
 Thinning rate of ice sheet on Mizuho Plateau, East Antarctica, determined by GPS differential positioning [1992, eng] **F-49247**
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 Seismological observations by a three-component broadband digital seismograph at Syowa Station, Antarctica [1992, eng] **L-49248**
- Shilling, F.M.**
 Nutrient transport capacities and metabolic rates scale differently between larvae of an antarctic and a temperate echinoderm [1991, eng] **B-47534**
- Shimada, K.**
 Unstable cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* during the austral summer at King George Island. (Extended abstract) [1993, eng] **B-48615**

- Variation in summer cold-hardiness of the antarctic oribatid mite *Alaskozetes antarcticus* from contrasting habitats on King George Island [1992, eng] **B-49211**
- Shimakura, S.**
Statistical characteristics of the polarization of Pc1 micropulsations at high latitudes [1992, eng] **K-47934**
- Shimazaki, K.**
Analysis of short-period P waves from the 1989 Macquarie Ridge earthquake using a broadband array in Japan [1993, eng] **E-48800**
- Shimoyama, A.**
Analyses of carboxylic acids and hydrocarbons in antarctic carbonaceous chondrites, Yamato-74662 and Yamato-793321 [1989, eng] **E-47851**
- Examination of organic compounds from insoluble organic matter isolated from some antarctic carbonaceous chondrites by heating experiments [1993, eng] **E-48172**
- Carbon isotopic compositions in antarctic carbonaceous chondrites [1993, eng] **E-48995**
- Shine, K.P.**
Radiative forcing of climate from halocarbon-induced global stratospheric ozone loss [1992, eng] **I-47609**
- Shipp, S.S.**
Evidence for a grounded ice sheet on the Ross Sea continental shelf during the Late Pleistocene and preliminary paleodrainage reconstruction [1992, eng] **E-48126**
- Shiraishi, K.**
Metamorphic evolution of the Sör Rondane Mountains, East Antarctica [1992, eng] **E-49235**
- Sm-Nd and Rb-Sr ages of metamorphic rocks from the Sör Rondane Mountains, East Antarctica [1992, eng] **E-49237**
- First report of a Cambrian orogenic belt in East Antarctica— an ion microprobe study of the Lützow-Holm Complex [1992, eng] **E-49239**
- Shishida, Y.**
Plectus antarcticus de Man, 1904 and *P. frigophilus* Kirjanova, 1958 (Nematoda: Plectidae), with emphasis on the male, from the Soya Coast, East Antarctica [1991, eng] **B-49194**
- Shmideberg, N.A.**
Hydrology and hydrochemistry of natural waters of East Antarctica [1992, rus] **E-48872**
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Reproductive effort and foraging energetics of Adélie penguins [1991, eng] **B-47545**
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- Polychaetes of the shallow sublittoral of Admiralty Bay, King George Island, South Shetland Islands [1993, eng] **B-48438**
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- Siegel, V.**
Zooplankton distribution, biochemistry and genetics [1991, eng] **B-47634**
- Review of length-weight relationships for antarctic krill [1993, eng] **B-49371**
- Siegenthaler, U.**
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- Radiocarbon dates of snow petrel regurgitations can reveal exposure periods for nunataks in Antarctica [1992, eng] **B-48246**
- Sievers, J.**
Radio-echo-sounding on Browning Pass, Terra Nova Bay area, Antarctica [1992, eng] **F-47834**
- Utilisation of ERS-1 data for mapping of Antarctica [1993, eng] **F-48651**
- Digital coastline of Filchner-Ronne-Schelfeis: interpretation of high quality satellite imagery [1991, eng] **F-48985**
- Fieldwork 1991/92 for interferometric SAR data analysis on Ronne Ice Shelf [1992, eng] **F-49079**
- Synthesis of remote sensing data on Wilkins Ice Shelf, Antarctica [1993, eng] **F-49418**
- Site survey for future heat flow measurements, Prince Albert Mountains, Antarctica [1992, eng] **G-47835**
- Sikes, E.L.**
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- Silvente, E.**
Ammonium to sulphate ratio in aerosol and snow of Greenland and antarctic regions [1993, eng] **I-48543**
- Silverman, E.D.**
Aggregation patterns of pelagic predators and their principal prey, antarctic krill, near South Georgia [1993, eng] **B-48952**
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- Cyclone behaviour response to changes in winter southern hemisphere sea-ice concentration [1993, eng] **I-49254**
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Environmental regulators of microbial activity in continental antarctic lakes [1993, eng] **B-48644**
- Environmental regulators of microbial activity in continental antarctic lakes [1993, eng] **B-48752**
- Sims, K.W.W.**
Studies of granitic and metamorphic rocks, Horlick and Whitmore Mountains area [1991, eng] **E-47559**
- Sinque, C.**
Summer distribution and abundance of fish larvae related with environmental variables (temperature and salinity) in the Admiralty Bay, Antarctica [1992, eng] **B-49447**
- Sitnov, S.A.**
Anomalies in the intra-annual ozone variability in polar regions from ozone sounding area: Resolute and Amundsen-Scott stations [1991, eng] **I-48145**
- Tropospheric ozone annual variation and possible troposphere-stratosphere coupling in the Arctic and Antarctic as derived from ozone soundings at Resolute and Amundsen-Scott stations [1993, eng] **I-48374**
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- Skerratt, J.H.**
Hydrocarbon and coprostanol levels in seawater, sea-ice algae and sediments near Davis Station in eastern Antarctica: a regional survey and preliminary results for a field fuel spill experiment [1992, eng] **J-48673**
- Skinner, J.D.**
Marion Island cat programme [1991, eng] **B-48889**
- South African research on antarctic seals [1991, eng] **B-48899**
- Skóra, K.E.**
Fish of Admiralty Bay (King George Island, South Shetland Islands, Antarctica) [1992, eng] **B-47481**
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Fast recession of the northern Larsen Ice Shelf monitored by space images [1993, eng] **F-49425**
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Density, energy content, and chemical activity of three conspicuous antarctic benthic marine invertebrates [1991, eng] **B-47540**
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- Sloan, L.C.**
Evidence from the antarctic continental margin of Late Paleogene ice sheets: a manifestation of plate reorganization and synchronous changes in atmospheric circulation over the emerging southern ocean? [1992, eng] **E-48285**

- Sluys, R.**
Synopsis of antarctic plagiostomids (Platyhelminthes, Prolecithophora), with the description of a new species and remarks on taxonomy, phylogeny, and biogeography [1992, eng] **B-47499**
- Smedley, D.J.**
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Snowdrift around antarctic buildings—effects of corner geometry and wind incidence [1993, eng] **G-48596**
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Cretaceous fossil wood and palynomorphs from Williams Point, Livingston Island, Antarctic Peninsula [1992, eng] **E-47854**
Preliminary lithofacies assessment and Ar-40/Ar-39 ages of Cenozoic volcanic sequences in eastern Marie Byrd Land [1993, eng] **E-47908**
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Known, new and probable snow petrel breeding locations in the Ross Dependency and Marie Byrd Land [1992, eng] **B-49268**
- Smetacek, V.**
Antarctic marine primary production, biogeochemical carbon cycles and climatic change [1992, eng] **B-48268**
- Smith, A.J.**
Effects of ionospheric horizontal electron density gradients on whistler mode signals [1992, eng] **K-48996**
Observation of two preferred paths for whistler mode VLF signals received at a non-conjugate location [1992, eng] **K-48997**
- Smith, C.H.**
Geological and geophysical investigations in the northern Ford Ranges, Marie Byrd Land, West Antarctica [1991, eng] **E-47565**
- Smith, G.A.**
Nearshore benthic marine sediments [1993, eng] **B-48745**
- Smith, G.I.**
Lithology and paleoclimatic implications of lacustrine deposits around Lake Vanda and Don Juan Pond, Antarctica [1993, eng] **E-48639**
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- Smith, J.J.**
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- Smith, J.P.**
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- Smith, R.I.L.**
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Dry coastal ecosystems on sub-antarctic islands [1993, eng] **B-49322**
- Smith, R.W.**
Eastward-moving 2-4 day waves in the winter antarctic mesosphere [1993, eng] **I-49084**
Mesospheric 12-hour oscillation near South Pole, Antarctica [1993, eng] **I-49284**
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Antarctic pressure and temperature anomalies surrounding the minimum in the Southern Oscillation index [1993, eng] **I-49052**
- Smith, V.R.**
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Surface air temperatures at Marion Island, sub-antarctic [1992, eng] **I-48245**
- Climate change and ecosystem functioning: a focus for sub-antarctic research in the 1990s [1993, eng] **I-48803**
- Smith, W.O., Jr.**
Phytoplankton sinking rates in the Ross Sea [1991, eng] **B-47530**
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Four new species of *Caloplaca* from Antarctica [1993, eng] **B-49351**
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Regional characteristics of *Thysanoessa macrura* spawning time in waters off the Antarctic Peninsula and in the Bellingshausen Sea [1992, rus] **B-48881**
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Visible and near-ultraviolet spectroscopy at McMurdo Station, Antarctica. 8. Observations of nighttime NO₂ and NO₃ from April to October 1991 [1993, eng] **I-48080**
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- Sonett, C.P.**
Supernova shock ensemble model using Vostok Be-10 radioactivity [1992, eng] **F-47547**
- Souchez, R.**
Ice composition evidence of marine ice transfer along the bottom of a small antarctic ice shelf [1991, eng] **F-47678**
- South Africa. Weather Bureau**
Newsletter/Nuusbrief, No.522, Sep. 1992 [1992, eng] **A-48022**
Newsletter/Nuusbrief, No.521, Aug. 1992 [1992, eng] **A-48023**
Newsletter/Nuusbrief, No.520, July 1992 [1992, eng] **A-48024**
Newsletter/Nuusbrief, No.524, Nov. 1992 [1992, eng] **A-49328**
Newsletter/Nuusbrief, No.525, Dec. 1992 [1992, eng] **A-49329**
Newsletter/Nuusbrief, No.526, Jan. 1993 [1993, eng] **A-49330**
Newsletter/Nuusbrief, No.527, Feb. 1993 [1993, eng] **A-49331**
Newsletter/Nuusbrief, No.528, Mar. 1993 [1993, eng] **A-49332**
Newsletter/Nuusbrief, No.531, June 1993 [1993, eng] **A-49333**
- Sovetskaja antarkticheskaia ekspeditsiia. Informatsionnyi biulleten'**
By radio from Antarctica [1991, rus] **I-47600**
- Spatz, A.P.**
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- Spaulding, S.A.**
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- Spielmeyer, W.**
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 Expedition ANTARKTIS X3 of RV *Polarstern* in 1992 [1993, eng] **D-48852**

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- Borkenthelea*, a new predaceous midge genus from subantarctic Argentina and Chile (Diptera: Ceratopogonidae) [1993, eng] **B-49439**

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- Winter distribution and overwintering strategies of the antarctic copepod species *Calanoides acutus*, *Rhincalanus gigas* and *Calanus propinquus* (Crustacea, Calanoida) in the Weddell Sea [1993, eng] **B-48917**

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- Antarctica: the last outpost of the honor system [1993, eng] **A-48398**
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- Stratigraphy of the Crashsite Group, Ellsworth Mountains, West Antarctica [1992, eng] **E-48060**
 Stratigraphy and structure of the Marble, Independence, and Patriot hills, Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48074**
 Breccia bodies in deformed Cambrian limestones, Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48075**
 Structure of the Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48076**
 Structure of the Sentinel Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48077**

Sprong, I.

- Acoustic observations on krill spring-summer migration and patchiness in the northern Weddell Sea [1992, eng] **B-47461**

Spude, C.H.

- East Base Historic Monument. Stonington Island/Antarctic Peninsula [1993, eng] **A-49491**

Spude, R.L.

- East Base Historic Monument. Stonington Island/Antarctic Peninsula [1993, eng] **A-49491**

Squyres, S.W.

- Terrigenous clastic sedimentation in antarctic dry valley lakes [1993, eng] **E-48638**

St. Germain, K.M.

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St. John, J.

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Stackebrandt, W.

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 Agmatites, basaltic intrusions and younger deformations in the "Berliner Mauer," Cape Sibbald, Aviator Glacier Tongue, north Victoria Land [1992, eng] **E-47824**
 Brief report on geomagnetic profile measurements in the vicinity of the Schirmacher Hills, Wohlthat Mountains, Queen Maud Land [1992, ger] **L-47742**

Staley, J.T.

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Stamnes, K.

- Several-fold enhancement of biologically effective ultraviolet radiation levels at McMurdo Station, Antarctica during the 1990 ozone "hole" [1992, eng] **I-48147**

Stanton, T.K.

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Stanyon, R.

- Cytotaxonomy of antarctic teleosts of the *Pagothenia/Trematomus* complex (Nototheniidae, Perciformes) [1992, eng] **B-47617**

Stark, A.A.

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Starmans, A.

- Lissarca notorcadensis* (Bivalvia: Phyllobryidae) living on *Notocidaris* sp. (Echinoidea: Cidaridae): population dynamics in limited space [1993, eng] **B-48251**

Staubes, R.

- Biogenic sulfur compounds in seawater and the atmosphere of the antarctic region [1993, eng] **J-48378**

Stearns, C.R.

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 Climatic differences in Antarctica from automatic weather stations [1992, eng] **I-47946**
 Antarctic pressure and temperature anomalies surrounding the minimum in the southern oscillation index [1992, eng] **I-47948**
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 Wind speed, wind direction, and air temperature at Pegasus North during 1990 [1991, eng] **I-48216**
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 Antarctic pressure and temperature anomalies surrounding the minimum in the Southern Oscillation index [1993, eng] **I-49052**

Steel, D.

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Steele, W.K.

- Radiocarbon dates of snow petrel regurgitations can reveal exposure periods for nunataks in Antarctica [1992, eng] **B-48246**

Steenkamp, M.

- Soil macrofauna and nitrogen on a sub-Antarctic island [1992, eng] **B-48010**
 Macroinvertebrates and peat nutrient mineralization on a sub-antarctic island [1993, eng] **E-48854**

Stefano, J.E.

- Application of ground-penetrating radar at McMurdo Station, Antarctica [1992, eng] **E-48465**

Stefanutti, L.

- Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.34 [1992, eng] **I-47385**
 Two years of monitoring of the antarctic stratosphere by means of lidar at the French Base of Dumont d'Urville [1992, eng] **I-47407**
 Lidar depolarization by nonspherical particles [1992, eng] **I-47408**
 Italian program in Antarctica, related to the ozone hole problem and the experimental cloud lidar pilot study [1991, eng] **I-47506**
 Lidar measurements of antarctic atmospheric parameters [1991, ita] **I-47681**
 Ozone hole [1991, ita] **I-47686**
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 Conference proceedings of the Italian Research on Antarctic Atmosphere, Vol.35 [1992, eng] **I-47785**
 Pinatubo in the Antarctic? [1992, eng] **I-47806**
 Preliminary ozone measurements by means of DIAL in Dumont d'Urville [1992, eng] **I-47807**
 Simulation of lidar depolarization by polar stratospheric clouds [1992, eng] **I-47808**
 Antarctic ozone lidar system [1992, eng] **I-48796**

Steffen, K.

- Microwave remote sensing of polynyas [1992, eng] **F-48195**
 Proceedings [1993, eng] **F-49403**
 Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**

Steig, E.J.

- "Taylor Ice-Dome" study: reconnaissance 1990-1991 [1991, eng] **F-47997**

Stein, M.

- Data report on temperature, salinity and dissolved silicate off the Antarctic Peninsula during SIBEX 1983-1985 [1992, eng] **J-49156**

Steinke, D.

- Caterpillar Mobil-Trac system's application to cold regions mobility problems [1993, eng] **G-49325**

Stenvers, O.

- Antarctic seals carry antibodies against seal herpesvirus [1992, eng] **B-48318**

Stephenson, J.A.E.

- Natural ozone depletion over Antarctica [1991, eng] **I-48908**
 Ozone depletion over the polar caps caused by solar protons [1992, eng] **K-48097**

Stephenson, N.C.N.

- High K/Na alkaline mafic dykes near Radok Lake, northern Prince Charles Mountains, East Antarctica [1992, eng] **E-48448**

Stern, C.R.

- Age and petrogenesis of the Sarmiento ophiolite complex of southern Chile [1992, eng] **E-48112**

- Stern, T.A.**
Seismic investigation of the boundary between East and West Antarctica [1991, eng] **E-47564**
Geophysical investigations of the tectonic boundary between East and West Antarctica [1993, eng] **E-48965**
- Stevens, D.P.**
Distribution of kinetic energy in the southern ocean: a comparison between observations and an eddy resolving general circulation model [1992, eng] **J-48264**
- Stewart, B.S.**
Diving and haulout behavior of crabeater seals in the Weddell Sea, Antarctica, during March 1986 [1992, eng] **B-47624**
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New species of Ammonoidea from Antarctica [1992, ger] **B-47702**
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Spatial and seasonal changes of transparency in waters of the Admiralty Bay (King George Island, South Shetland Islands, The Antarctic) [1992, eng] **J-49102**
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Steady-state and transient modeling of tracer and nutrient distributions in the global ocean. Progress report, June 1, 1991-March 31, 1992 [1992, eng] **J-48095**
- Stockton, W.L.**
Extracellular matrix augments mechanical properties of pseudopodia in carnivorous foraminiferan *Astrammina rara*: role in prey capture [1992, eng] **B-48954**
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Oligocene record of the coral *Flabellum* from Antarctica [1992, eng] **E-49006**
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Properties of austral winter clouds derived from radiometric profiles at the South Pole [1993, eng] **I-49045**
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Scientific activities in Antarctica, opportunities for the Netherlands [1992, eng] **A-49171**
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Pre-Cenozoic magmatic history of the Thurston Island crustal block, West Antarctica [1993, eng] **E-48812**
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Upper Proterozoic rift-related rocks in the Pensacola Mountains, Antarctica: precursors to supercontinent breakup? [1992, eng] **E-49234**
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Lower Cretaceous volcanic rocks on continental margins and their relationship to the Kerguelen Plateau [1992, eng] **E-47964**
Trace element and isotopic characteristics of Kerguelen-Heard Plateau basalts [1992, eng] **E-47965**
Zeolite-facies metamorphism of central Kerguelen Plateau basalts [1992, eng] **E-47966**
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Correlating the auroral activity with the southern high-latitude O₃-content [1992, eng] **I-47814**
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- Antarctic laboratory for cosmic rays (LARC): status report [1992, eng] **K-47798**
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Sensitivity of southern ocean sea-ice simulations to different atmospheric forcing algorithms [1992, eng] **F-47706**
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Century-scale effects of increased atmospheric CO₂ on the ocean-atmosphere system [1993, eng] **I-48723**
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South Indian Ocean Current [1992, eng] **J-47880**
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Fuel spill response contingency planning process [1993, eng] **B-48935**
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Earth's crust in Antarctica and the effective relief of the continent [1992, eng] **L-48466**
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Radiocarbon dates from the McMurdo Ice Shelf, Antarctica: implications for debris band formation and glacial history [1991, eng] **E-48000**
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Bromoalkane production by antarctic ice algae [1993, eng] **I-48377**
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Signatures of antarctic firn by means of ERS-1 AMI and by field measurements [1993, eng] **F-48648**
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- Sugden, D.E.**
Subglacial meltwater channel systems and ice sheet overriding, Asgard Range, Antarctica [1991, eng] **E-48597**
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Nitrogen isotopic compositions in three antarctic and two non-antarctic eucrites [1993, eng] **E-48703**
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Oceanographic conditions in the Bransfield Strait and in the limits of the adjacent seas [1992, kor] **J-48162**
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Ecology of sea ice biota. 1. Habitat, terminology, and methodology [1992, eng] **B-47478**
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Total atmospheric ozone measurements in Antarctica, 1988-1989 [1991, rus] **I-47598**
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Early life cycle of cephalopods in relation to the major oceanographic features of the southwest Atlantic Ocean [1992, eng] **B-47915**
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Rifting, ozone layer and the level of the world ocean [1992, rus] **I-48304**
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Sensitivity experiment of ocean general circulation model—responses for wind stress (first report) [1991, jpn] **J-48302**
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Mineralogical studies of lunar meteorite Yamato-793169, a mare basalt [1993, eng] **E-48685**
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 Snow and ice applications of AVHRR in polar regions: report of a workshop held in Boulder, Colorado, 20 May 1992 [1993, eng] **F-49404**
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- Thomson, M.R.A.**
 Late Cretaceous and Paleocene decapod crustaceans from James Ross Basin, Antarctic Peninsula [1993, eng] **E-48239**
- Thomson, N.R.**
 Effects of ionospheric horizontal electron density gradients on whistler mode signals [1992, eng] **K-48996**
 Observation of two preferred paths for whistler mode VLF signals received at a non-conjugate location [1992, eng] **K-48997**
- Thorpe, J.P.**
 Genetic evidence of population heterogeneity and cryptic speciation in the ommastrephid squid *Martialia hyadesi* from the Patagonian Shelf and Antarctic Polar Frontal Zone [1993, eng] **B-49178**
- Thorson, P.H.**
 Natural history of Ross Sea emperor penguin colonies [1991, eng] **B-47858**
- Thost, D.E.**
 Mode of occurrence, geochemistry and mineral textures of mafic to ultramafic rocks from the Bölingen Islands, Prydz Bay, East Antarctica [1992, eng] **E-49242**
- Thoste, V.**
 Radioelement distribution in the sedimentary sequence of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48072**
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 Auroras [1991, fre] **K-48291**
- Thyssen, F.**
 Bottom melting on FRIS: results from different methods [1992, eng] **F-49067**
- Tian, S.F.**
 Interannual fluctuations of sea ice extent in the Antarctic and associated atmospheric conditions [1992, eng] **F-48188**

- Tiemann, H.**
Limacospaera, an unusual mesogastropod (Lamellariidae) larva of the Weddell Sea (Antarctica) [1993, eng] **B-48476**
- Tien, G.**
Bacterial abundances during the 1989-1990 austral summer phytoplankton bloom in the Gerlache Strait [1991, eng] **B-47528**
- Tingey, R.J.**
Geology of the Bunger Hills area, Antarctica: implications for Gondwana correlations [1993, eng] **E-47906**
- Tirabassi, T.**
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- Tison, J.L.**
Low salinity frazil ice generation at the base of a small antarctic ice shelf [1993, eng] **F-49016**
- Tleimat, B.**
Use of vapor compression distillation for recycling gray water as an early application in the antarctic planetary analog [1992, eng] **G-48036**
- Todd, F.S.**
Antarctica: an international treasure [1991, eng] **A-48507**
Polar penguin mating game [1991, eng] **B-48508**
- Toh, H.**
Thinning rate of ice sheet on Mizuho Plateau, East Antarctica, determined by GPS differential positioning [1992, eng] **F-49247**
- Tohyama, F.**
Observations of the geomagnetic field by Polar Patrol Balloon (PPB) experiment in Antarctica [1993, eng] **K-48517**
- Tokarczyk, R.**
Hydrology and hydrochemistry of the surface water layer near the ice-edge in the Scotia Sea (December 1989-January 1989) [1991, eng] **J-48229**
- Tokieda, K.**
Ar-40/Ar-39 geochronological studies of some paleomagnetic samples of East Antarctica [1992, eng] **E-49238**
- Tokyo, National Institute of Polar Research**
Overview of the National Institute of Polar Research '92 [1992, jpn] **A-48371**
- Tolbert, M.A.**
Fourier transform infrared studies of the interactions of HCl with model polar stratospheric cloud films [1993, eng] **I-48560**
- Tolomio, C.**
Distribution of photoautotrophic picoplankton in Terra Nova Bay, summer 1989-1990 [1993, fre] **B-48828**
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Multi-wavelength sun-photometric measurements of atmospheric turbidity parameters at Terra Nova Bay during Jan. 1990 [1992, eng] **I-47396**
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- Tomczak, M.**
Mechanism for Antarctic Intermediate Water renewal in a world ocean model [1993, eng] **B-49271**
- Tomeoka, K.**
Mineralogy and petrology of the CK chondrites Yamato-82104, Yamato-693 and a Carlisle-Lakes-type chondrite Yamato-82002 [1993, eng] **E-48695**
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Major, minor and trace element distributions in surface water in Terra Nova Bay, Antarctica [1992, eng] **J-48154**
- Torigoye, N.**
Low U/Pb source in the moon: U-Th-Pb systematics of lunar meteorite Yamato-793169 [1993, eng] **E-48688**
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- Torii, T.**
Cruising to the Ross Sea region on board the *Frontier Spirit* [1991, jpn] **A-48417**
Sterols and fatty acids in foams from antarctic lakes of the Dry Valleys in south Victoria Land [1985, eng] **B-47852**
- Torres, J.J.**
Community structure and trophic ecology of zooplankton in the Scotia Sea marginal ice zone in winter (1988) [1993, eng] **B-48391**
Trophic structure in open waters of the marginal ice zone in the Scotia-Weddell confluence region during spring (1983) [1993, eng] **B-49114**
- Torres N., D.**
Indigenous skull on Cape Shirreff: a study of developments [1992, spa] **A-47926**
Marked pinnipeds from different locations sighted in the South Shetland Is. [1991, spa] **B-48086**
Sketch of Cape Shirreff on Livingston I. [1993, spa] **C-49463**
- Torres, T.**
First study of *in situ* fossil woods from the Upper Cretaceous of Livingston Island, South Shetland Islands, Antarctica: palaeoecological investigations [1993, eng] **E-49441**
- Toyoda, S.**
ESR applications to meteorite samples [1993, eng] **E-48709**
- Tranter, T.H.**
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Biomass distribution among trophic levels in lakes lacking vertebrate predators [1993, eng] **B-48319**
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- Tréguer, P.**
Dynamics of nutrients and phytoplankton, and fluxes of carbon, nitrogen and silicon in the antarctic ocean [1992, eng] **J-47448**
Silica cycle in the antarctic ocean: is the Weddell Sea atypical [1993, eng] **J-48727**
- Treub, L.F.**
Penguins in the Antarctic [1993, ger] **B-48338**
- Triantafyllou, M.S.**
Proceedings. Vol.2 [1992, eng] **F-47693**
- Tribaudino, M.**
Orthopyroxenes from granulite rocks of the Wilson Terrane (Victoria Land, Antarctica): crystal chemistry and cooling history [1992, eng] **E-47483**
- Trivelpiece, S.G.**
Continuing studies of the population biology and foraging behavior of Adélie, gentoo, and chinstrap penguins [1991, eng] **B-47544**
- Trivelpiece, W.Z.**
Continuing studies of the population biology and foraging behavior of Adélie, gentoo, and chinstrap penguins [1991, eng] **B-47544**
- Trivero, P.**
Antarctic RASS: Test in severe weather conditions [1992, eng] **I-47799**
- Troiashkin, A.A.**
Bacteriological evaluation of the air in antarctic living quarters [1991, rus] **B-47595**
Sanitary evaluation of bacterial contamination of a coastal antarctic station area [1991, rus] **B-47596**
- Troitskiĭ, L.S.**
Pollen and spores from glaciers and from the proglacial zone in the Arctic and Antarctica [1992, eng] **B-47658**
- Troncoso, J.S.**
Anatomical and taxonomical studies of the antarctic nudibranchs *Austrodo-ris kerguelenensis*, (Bergh, 1884) and *A. georgiensis* n.sp. from the Scotia Sea [1993, eng] **B-49118**
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Fish of the family Moridae from the southeastern Atlantic (Genera *Gadella*, *Halargyreus*, and *Antimora*) [1992, eng] **B-47857**
- Trupin, A.S.**
Effects of polar ice on the earth's rotation and gravitational potential [1993, eng] **L-48556**
- Tsang, L.**
Inversion of snow parameters from passive microwave remote sensing measurements by a neural network trained with a multiple scattering model [1992, eng] **F-47439**
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Digital photogrammetric approach to ice-flow determination in Antarctica [1992, eng] **F-48525**
- Tshudy, D.M.**
Late Cretaceous and Paleocene decapod crustaceans from James Ross Basin, Antarctic Peninsula [1993, eng] **E-48239**

- Tsigel'nitskii, I.I.**
Automatic meteorological stations in the Antarctic [1991, rus] **I-47597**
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Analysis of short-period P waves from the 1989 Macquarie Ridge earthquake using a broadband array in Japan [1993, eng] **E-48800**
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Meteorological observations at Syowa Station and Asuka Station in 1990 by the 31st Japanese Antarctic Research Expedition [1993, jpn] **I-49337**
- Tuck, A.F.**
Stratospheric dryness: antiphased desiccation over Micronesia and Antarctica [1993, eng] **I-49127**
- Tucker, W.B.**
Physical properties of sea ice relevant to remote sensing [1992, eng] **F-48191**
- Tuhkanen, S.**
Climate of Tierra del Fuego from a vegetation geographical point of view and its ecoclimatic counterparts elsewhere [1992, eng] **I-48156**
- Tunik, A.L.**
Proceedings. Vol.2 [1992, eng] **F-47693**
- Tureo, R.P.**
Heterogeneous chemistry on antarctic polar stratospheric clouds: a microphysical estimate of the extent of chemical processing [1993, eng] **I-48623**
Model for heterogeneous chemical processes on the surfaces of ice and nitric acid trihydrate particles [1993, eng] **I-49039**
- Turner, B.R.**
Paleosols in Permo-Triassic continental sediments from Prydz Bay, East Antarctica [1993, eng] **E-48859**
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Ocean-climate studies in the Antarctic [1993, eng] **J-49484**
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First assessment of the value of ERS-1 scatterometer winds for meteorological studies in the polar regions [1993, eng] **I-48655**
Comparison of arctic and antarctic mesoscale vortices [1993, eng] **I-49048**
- Turner, J.W., Jr.**
Dispersal and provenance of fine-grained sediments and the influence of marine transgression on the Ross Sea continental shelf, Antarctica [1992, eng] **E-48524**
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Present-day antarctic climatology of the NCAR Community Climate Model Version 1 [1993, eng] **I-48089**
Hemispheric atmospheric variations and oceanographic impacts associated with katabatic surges across the Ross Sea Shelf, Antarctica [1993, eng] **I-49050**
- U.S. Global Change Research Program**
GLOBEC: Southern Ocean Program; GLOBEC Workshop on Southern Ocean Marine Animal Populations and Climate Change [1991, eng] **B-47442**
- U.S. Marine Mammal Commission**
Annual report to Congress, 1992 [1993, eng] **A-47779**
- U.S. National Aeronautics and Space Administration**
Epidemiologic research in Antarctica [1990, eng] **H-48463**
- U.S. National Science Foundation**
Antarctic Journal of the United States, Vol.27, No.4 [1992, eng] **A-47604**
Antarctic journal of the United States, vol.28, no.2 [1993, eng] **A-49184**
United States Antarctic Program. Science Program Plan 1992-93 [1992, eng] **A-49225**
- U.S. Naval Support Force Antarctica**
Report of Operation Deep Freeze 85, 1984-1985 [1985, eng] **G-47447**
Final report of Operation Deep Freeze '91 (1990-91) [1991, eng] **G-49474**
- Ugazio, S.**
Estimates of denitrification in the 1990 antarctic spring stratosphere [1992, eng] **I-47805**
Combined observations of tropospheric and stratospheric thin clouds at McMurdo, Antarctica [1992, eng] **I-47815**
Combined system for observations of tropospheric and stratospheric thin clouds [1993, eng] **I-48014**
- Ulander, L.M.H.**
Sea ice altimetry [1992, eng] **F-48192**
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Atmospheric circulation of the Southern Hemisphere and geomagnetic activity [1991, rus] **I-47584**
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On a trial estimation of construction work for the ground runway at East Ongul Island in Antarctic [1993, jpn] **G-49339**
- Uranov, E.N.**
37th Soviet Antarctic Expedition (SAE) [1992, eng] **D-49155**
- Uryu, M.**
Diagnostic model study of the seasonal variation of global ozone and the antarctic ozone hole [1992, eng] **I-47776**
- Ushio, S.**
Oceanographic data in Lützow-Holm Bay of Antarctic Climate Research Programme from March 1990 to January 1991 (JARE-31) [1993, eng] **J-48408**
Seasonal variations of the flow and oceanic structure under fast ice in Lützow-Holm Bay, Antarctica [1993, eng] **J-49300**
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Immunoreactive atrial natriuretic-like peptide in antarctic teleosts [1993, eng] **B-49152**
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Age structure of *Chionodraco hamatus* (Teleostei, Channichthyidae) samples caught in Terra Nova Bay, East Antarctica [1992, eng] **B-49214**
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Diurnal variations in biological characteristics of krill, *Euphausia superba* Dana, to the west of the South Orkney Islands, 24 March to 18 June 1990, based on data reported by a biologist-observer [1993, eng] **B-49374**
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Limnological features of the saline lakes of the Bunger Hills (Wilkes Land, Antarctica) [1993, eng] **B-47902**
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New species of *Uronychia* (Ciliophora, Hypotrichida) from Antarctica: *Uronychia antarctica* [1991, eng] **B-47648**
Biology of *Euplotes focardii*, an antarctic ciliate [1993, eng] **B-49230**
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Use of the Brewer spectrophotometer in measurements of total O₃, SO₂, NO₂, UVB and for Umkehr profiling [1992, eng] **I-47410**
Total ozone measurements from Scott Base, Antarctica with a Dobson and a Brewer spectrophotometer [1992, eng] **I-47813**
Intercomparison of total ozone measured at low sun angles by the Brewer and Dobson spectrophotometers at Scott Base, Antarctica [1993, eng] **I-49444**
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Lichen colonization of recent moraines on Livingston Island (South Shetland I., Antarctica) [1993, eng] **B-48629**
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Bonn, the 16th Antarctic Treaty Consultative Meeting [1991, eng] **A-48972**
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Lichen flora of Deception Island, South Shetland Islands [1993, eng] **B-48501**
Recent pollen diagram from Antarctica (King George Island, South Shetland Islands) [1993, eng] **B-48718**
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Scavenging of Th-230 and Pa-231 near the Antarctic Polar Front in the South Atlantic [1993, eng] **J-48423**
- Van der Spoel, S.**
Clio piatkowski, a mesopelagic pteropod new to science (Gastropoda, Opisthobranchia) [1992, eng] **B-49320**
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Land ice and climate [1992, eng] **F-48658**
Ice sheets: growing or shrinking [1993, eng] **F-48829**
Seasonal variations in brightness temperature for central Antarctica [1993, eng] **F-49423**
- Van Der Wateren, F.M.**
Cenozoic glaciation of the Rennick Glacier area, the Everett Range and Yule Bay area, north Victoria Land, Antarctica [1992, eng] **E-47817**
Glacial geology of the area between David and Mawson Glaciers. A reconnaissance of the southern Prince Albert Mountains, Victoria Land, Antarctica [1992, eng] **E-47818**
Glacial geology of Central and North Victoria Land, Antarctica [1992, eng] **E-49165**

- Van Drimmelen, M.**
Water balance and osmoregulation in weevil larvae (Coleoptera: Curculionidae: Brachycerinae) from three different habitats on subantarctic Marion Island [1992, eng] **B-47500**
- Van Franeker, J.A.**
Diet of fulmarine petrels in the Windmill Islands, Wilkes Land, Antarctica. Preliminary results [1992, eng] **B-49168**
- Van Leeuwen, J.F.N.**
Recent pollen diagram from Antarctica (King George Island, South Shetland Islands) [1993, eng] **B-48718**
- Van Rijswijk, P.**
Path analyses of the influence of substrate composition on nematode numbers and on decomposition of stranded seaweed at an antarctic coast [1993, eng] **B-49107**
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Antarctic sea ice mapping using the AVHRR [1993, eng] **C-48913**
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Coupled ocean and sea-ice models: review and perspectives [1989, eng] **F-49057**
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Geomagnetic perturbations in the southern polar cap [1992, eng] **K-47512**
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Thematic maps of Filchner-Ronne Ice Shelf [1991, eng] **F-48986**
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Snow surface temperatures in West Antarctica [1992, eng] **F-49206**
Ice shelves on the Antarctic Peninsula: changing climate and sea level [1992, eng] **F-49209**
Use of visible satellite imagery over ice sheets [1992, eng] **F-49222**
Synthesis of remote sensing data on Wilkins Ice Shelf, Antarctica [1993, eng] **F-49418**
- Vavra, C.L.**
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Results of phytopigments analysis by high performance liquid chromatography during the oceanic cruise in the Straits of Magellan (Feb.-Mar. 1991) [1991, eng] **B-49038**
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Foraging interactions between pelagic seabirds and antarctic krill at South Georgia during austral winter 1991 [1991, eng] **B-47859**
Aggregation patterns of pelagic predators and their principal prey, antarctic krill, near South Georgia [1993, eng] **B-48952**
- Velivetskaia, T.A.**
Isotopic pleiad of oxygen in atmospheric precipitation in the polar regions [1991, rus] **J-48101**
- Venkatesan, M.I.**
Coprostanol as sewage tracer in McMurdo Sound, Antarctica [1992, eng] **G-48679**
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Plutonic rocks of the English Coast and northern Behrendt Mountains, eastern Ellsworth Land, Antarctica [1991, eng] **E-47566**
Igneous petrology and geochemistry of the southern Heritage Range, Ellsworth Mountains, West Antarctica [1992, eng] **E-48071**
Chemical weathering of Cu, Fe, and Pb sulfides, southern Ellsworth Mountains, West Antarctica [1992, eng] **E-48079**
- Venz, K.**
Toward a high-resolution stable isotopic record of the southern ocean during the Pliocene-Pleistocene (4.8 to 0.8 Ma) [1992, eng] **J-47769**
- Verbeek, P.J.M.**
Role of the Netherlands as a new consultative party to the Antarctic Treaty [1992, eng] **M-49170**
- Verbers, A.L.L.M.**
Cenozoic glaciation of the Rennick Glacier area, the Everett Range and Yule Bay area, north Victoria Land, Antarctica [1992, eng] **E-47817**
Glacial geology of the area between David and Mawson Glaciers. A reconnaissance of the southern Prince Albert Mountains, Victoria Land, Antarctica [1992, eng] **E-47818**
Glacial geology of Central and North Victoria Land, Antarctica [1992, eng] **E-49165**
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Antarctic temperature perturbation due to the QBO and the secular ozone trend [1992, eng] **I-47412**
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- Verdon, C.**
Seasonal importance of oceanic myctophids in King Penguin diet at Crozet Islands [1993, eng] **B-48919**
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Morphology and development of sea terraces on the shores of Bunger Hills [1991, rus] **E-47583**
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RACER: Phytoplankton growth rates in the northern Gerlache Strait during the spring bloom of 1989 [1991, eng] **B-47532**
- Vestal, J.R.**
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Environmental regulators of microbial activity in continental antarctic lakes [1993, eng] **B-48644**
Environmental regulators of microbial activity in continental antarctic lakes [1993, eng] **B-48752**
- Veth, C.**
Factors controlling phytoplankton ice-edge blooms in the marginal ice-zone of the northwestern Weddell Sea during sea ice retreat 1988: field observations and mathematical modelling [1993, eng] **B-49113**
On processes determining the vertical stability of surface waters in the marginal ice zone of the northwestern Weddell Sea and their relationship with phytoplankton bloom development [1992, eng] **J-47458**
- Vetter, R.A.H.**
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- Viall, J.D.**
South Africa: the road to the Antarctic Treaty [1991, eng] **M-48892**
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Cu, Zn and Cd content in different tissues of the antarctic scallop *Adamussium colbecki*: role of metallothionein in heavy metal homeostasis and detoxication [1993, eng] **B-48815**
- Viehoff, T.**
Air-sea-ice interactions in the Weddell Sea [1993, eng] **F-48653**
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Ice drift in the Weddell Sea in 1990-1991 as tracked by a satellite buoy [1993, eng] **F-49058**
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Volcanic tremors at Deception Island (South Shetland Islands, Antarctica) [1992, eng] **L-48035**
- Villafañe, V.**
Impact of natural ultraviolet radiation on rates of photosynthesis and on specific marine phytoplankton species [1992, eng] **B-47703**
AMLR program: Chlorophyll-*a* distribution and rates of primary production around Elephant Island [1991, eng] **B-47864**
AMLR program: Size distribution and species composition of the phytoplankton crop around Elephant Island [1991, eng] **B-47866**
Phytoplankton around Elephant Island, Antarctica [1993, eng] **B-48332**
- Villanueva López, V.**
Cartographic elevation and geographic information system on Fildes Peninsula, King George I. [1993, spa] **C-49462**
- Vincent, W.F.**
Desiccation and recovery of antarctic cyanobacterial mats [1992, eng] **B-47619**
Microbial communities and processes in antarctic flowing waters [1993, eng] **B-48753**
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Temporal and spatial variations of phytoplankton from Boeckella Lake (Hope Bay, Antarctic Peninsula) [1993, eng] **B-48435**

- Vinuesa, R.E.
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- Virginia, R.A.
Nematodes in the McMurdo Dry Valleys of southern Victoria Land [1991, eng] **B-48208**
Life cycle of the microbivorous antarctic Dry Valley nematode *Scottinema lindsayae* (Timm 1971) [1993, eng] **B-48328**
Extraction of nematodes from Dry Valley antarctic soils [1993, eng] **B-49229**
- Virtue, P.
Lipid composition of *Euphausia superba* Dana in relation to the nutritional value of *Phaeocystis pouchetii* (Hariot) Lagerheim [1993, eng] **B-48439**
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Ozone hole over Antarctica [1991, ita] **I-47683**
- Vishniac, H.S.
Cryptococcus antarcticus sp. nov. and *Cryptococcus albidosimilis* sp. nov., basidioblastomycetes from antarctic soils [1992, eng] **B-47704**
Microbiology of antarctic soils [1993, eng] **B-48748**
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Estimates of denitrification in the 1990 antarctic spring stratosphere [1992, eng] **I-47805**
Combined observations of tropospheric and stratospheric thin clouds at McMurdo, Antarctica [1992, eng] **I-47815**
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- Vladimirskaya, E.V.
Results of plankton studies conducted by VNIRO on board the R/V *Akademik Knipovich* in the Antarctic [1991, rus] **B-47894**
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Performance of the *Nathaniel B. Palmer* in ice [1993, eng] **G-48943**
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Radiocarbon dates of snow petrel regurgitations can reveal exposure periods for nunataks in Antarctica [1992, eng] **B-48246**
- Vogelin, D.
Phytoplankton sinking rates in the Ross Sea [1991, eng] **B-47530**
- Voisin, C.
Catharacta antarctica lonnbergi Mathews, 1912 (currently *Catharacta skua lonnbergi*; Aves, Charadriiformes): proposed conservation of the sub-specific name [1993, eng] **B-49342**
- Voisin, J.F.
Case 2784: *Procellaria gigantea* Gmelin, [1789] (currently *Macronectes giganteus*; Aves, Procellariiformes): proposed conservation of usage of the specific name by designation of a neotype [1992, eng] **B-48981**
Catharacta antarctica lonnbergi Mathews, 1912 (currently *Catharacta skua lonnbergi*; Aves, Charadriiformes): proposed conservation of the sub-specific name [1993, eng] **B-49342**
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Study of a new waste water treatment plant for the Italian antarctic station [1993, eng] **G-48939**
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Calibration of alkenone unsaturation ratios (Uk'37) for paleotemperature estimation in cold polar waters [1993, eng] **J-48454**
- Völksen, C.
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Used as subordinate term under various types of ice (snow)

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- Aurora, June 1992, Vol.11, No.4 [1992, eng] **A-49346**

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- Silas: the antarctic diaries and memoir of Charles S. Wright [1993, eng] **A-49173**

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- Seismic study of East/West Antarctica boundary [1991, eng] **E-47564**
- Siple Coast seismic and gravity studies [1991, eng] **E-47994**
- Morphology and tectonics of the Australian-Antarctic Discordance between 123E and 128E [1993, eng] **E-48823**
- Seafloor spreading in the Weddell Sea and southwest Atlantic since the Late Cretaceous [1993, eng] **E-48843**
- Analysis of gravity measurements on the Ross Ice Shelf, Antarctica [1992, eng] **F-48129**
- Gravimetric tidal measurements on Filchner Ronne Ice Shelf [1992, eng] **J-49070**
- Geophysical exploration of the periantarctic marine platform [1991, ita] **L-47674**
- Gravity transect across the Transantarctic Mountains [1992, eng] **L-47837**
- Gravity surveys of Mount Melbourne and the Rennick and Lillie Glaciers [1992, eng] **L-47840**
- Earth's crust in Antarctica and the effective relief of the continent [1992, eng] **L-48466**
- Tidal gravity variations recorded at Asuka Station [1993, eng] **L-48542**
- Effects of polar ice on the earth's rotation and gravitational potential [1993, eng] **L-48556**
- Gravity field determination by satellite altimetry and surface gravity data [1992, eng] **L-49245**
- Handbooks**
- Antarctic field manual [1993, eng] **A-49199**
- Antarctic operations manual [1993, eng] **A-49200**
- Antarctic field manual, 1991 [1991, eng] **A-49285**
- Antarctic operations manual, 1991 [1991, eng] **A-49287**
- Antarctic operations manual [1992, eng] **A-49288**
- Antarctic field manual [1992, eng] **A-49306**
- ANARE first aid manual (5th ed.) [1992, eng] **H-47419**
- Antarctic first aid manual [1993, eng] **H-49198**
- Antarctic first aid manual [1992, eng] **H-49305**
- Health**
- See: Hygiene; Pathology; Sanitation*
- Heat exchange**
- Microwave remote sensing of polynyas [1992, eng] **F-48195**
- Characterization of snow on floating ice [1992, eng] **F-48196**
- Coupled ocean and sea-ice models: review and perspectives [1989, eng] **F-49057**
- Late Pleistocene variations in antarctic sea ice. 1. Effect of orbital insolation changes [1988, eng] **F-49492**
- Late Pleistocene variations in antarctic sea ice. 2. Effect of interhemispheric deep-ocean heat exchange [1988, eng] **F-49493**
- Numerical experiments on a possible mechanism of cyclogenesis over the circum-antarctic ocean [1992, eng] **I-47392**
- Numerical experiments on air-sea heat exchange and cyclogenesis [1992, eng] **I-47794**
- Climatic atmospheric outflow at the continental margin [1992, eng] **I-47812**
- Preprints [1992, eng] **I-47940**
- Cyclogenesis in the antarctic regions [1993, eng] **I-48132**
- Antarctic climate and general circulation model experiments [1992, eng] **I-48259**
- Parameters of the surface turbulent exchange at Zhongshan Station [1993, chi] **I-48770**
- Environmental and climatic links between Antarctica and South Africa [1991, eng] **I-48906**
- Comparison of arctic and antarctic mesoscale vortices [1993, eng] **I-49048**
- Global climate models and Antarctica [1992, eng] **I-49207**
- 1990 antarctic surface energy balance components, Zhongshan Station [1993, eng] **I-49452**
- GCM study of antarctic glaciation [1989, eng] **I-49494**
- Heat and mass balances of the South Atlantic Ocean calculated from a numerical model [1993, eng] **J-47724**
- Transport, heat, and freshwater fluxes within a diagnostic numerical model (FRAM) [1993, eng] **J-48372**
- Convection studies [1993, eng] **J-49089**
- See [also]: Earth/Heat flow. Also used as subordinate term under various types of ice (snow)*
- Heating**
- Newly developed snow vehicle (SM100S) for Antarctica. 5 [1992, jpn] **G-48315**
- Technical means used in Antarctica [1992, spa] **G-48575**
- Greenhouses at McMurdo and Amundsen-Scott stations [1993, eng] **G-48938**
- Height determination**
- See: Altimetry*
- Hepaticae**
- See under: Bryophyta*
- HF communication**
- Short wave automatic system for data transmission between Rome and the Italian Antarctic Base [1993, eng] **A-48945**
- Medical and health aspects of the Italian antarctic programme [1993, eng] **H-48927**
- HF field strength at Showa Station in 1991 [1993, eng] **K-48515**
- Solar wind/magnetosphere/ionosphere coupling [1993, eng] **K-48518**
- SHARE—An HF radar system for SANAE [1991, eng] **K-48904**
- Hiss**
- See under: VLF emissions*
- Historical geology**
- Antarctic Expedition GANOVEX VI: introduction to field results [1992, eng] **D-47816**

Historical geology (cont.)

- Permian plants from the Ellsworth Mountains [1992, eng] **E-47509**
- Paleosols from the Beardmore Glacier region [1991, eng] **E-47551**
- Jurassic fault and dike patterns near Beardmore Glacier [1991, eng] **E-47552**
- Age of charnockitic gneiss from the Thala Hills [1991, eng] **E-47570**
- Late Permian Palaeogeography maintained a temperate Gondwanan climate [1993, eng] **E-47611**
- Cenozoic glaciation of the eastern Oates Coast region [1992, eng] **E-47817**
- Bunger Hills geology and Gondwana correlations [1993, eng] **E-47906**
- Trace elements and isotopics of Kerguelen-Heard basalts [1992, eng] **E-47965**
- K-Ar and Ar-40/Ar-39 ages of central Kerguelen Plateau basalts [1992, eng] **E-47967**
- Late Cretaceous dinoflagellate cysts from the Kerguelen Plateau [1992, eng] **E-47982**
- Taylor Glacier advances in Arena Valley [1991, eng] **E-48002**
- Geology and paleontology of the Ellsworth Mountains, West Antarctica [1992, eng] **E-48057**
- Geologic history of the Ellsworth Mountains [1992, eng] **E-48058**
- Stratigraphy and structure of three hills in the Heritage Range [1992, eng] **E-48074**
- Structure of the Heritage Range [1992, eng] **E-48076**
- Structure of the Sentinel Range [1992, eng] **E-48077**
- Upper Cretaceous planktic foraminiferal biozonation for the Austral Realm [1992, eng] **E-48091**
- Contributions to antarctic research III [1992, eng] **E-48122**
- Glacial history of the Antarctic Peninsula's continental shelf [1992, eng] **E-48127**
- Deep structure beneath the northern Kerguelen Plateau [1993, fre] **E-48201**
- Ross and Delamerian orogens of Antarctica and Australia [1993, eng] **E-48247**
- Orogenesis within the antarctic margin of Gondwana [1993, eng] **E-48248**
- Geological research on Adélie Coast [1991, fre] **E-48294**
- Magnetobiochronology of the southern oceans [1991, eng] **E-48370**
- Lithostratigraphy of an early Cretaceous outcrop on Alexander I. [1993, eng] **E-48394**
- Deformational history of the Larsemann Hills [1993, eng] **E-48440**
- Glacial-interglacial sequences on the Antarctic Peninsula [1993, eng] **E-48503**
- Creation and destruction of the Weddell Sea floor in the Jurassic [1993, eng] **E-48726**
- Magmatic history of the Thurston I. crustal block [1993, eng] **E-48812**
- Till stratigraphy and glacial history of the Vestfold Hills area, East Antarctica [1993, eng] **E-48830**
- South African earth science research in the Antarctic [1991, eng] **E-48902**
- Facies and depositional processes in ancient pelagic sediments [1993, eng] **E-48961**
- Vestfold Hills basement complex and tectonics of the mobile belt in East Antarctica [1992, eng] **E-49164**
- Sör Rondane Mountains Late Cenozoic glacial history [1992, eng] **E-49249**
- Cenozoic glacial history of Antarctica—A correlative synthesis [1992, eng] **E-49250**
- Weddell Sea Middle Eocene-Late Oligocene sediments [1993, eng] **E-49277**
- Surficial geology and geomorphology of middle Taylor Valley [1991, eng] **E-49289**
- Glacial climates in the antarctic region during the Late Paleogene: evidence from northwest Tasmania, Australia [1993, eng] **I-47931**
- Comment and reply on paper by Macphail et al [1993, eng] **I-49361**

See also: Geochronology

History

- Archival and other data for an antarctic chronology [1992, eng] **A-47518**

- Contribution of SCAR to antarctic research [1992, eng] **A-47519**
- Reclaiming a lost antarctic base [1993, eng] **A-47731**
- Indigenous skull on Cape Shirreff: a study of developments [1992, spa] **A-47926**
- Antarctic tourism: Chile's position [1992, spa] **A-47930**
- Antarctica: both heaven and hell [1991, eng] **A-48038**
- Achievements and competition at the South Pole [1992, eng] **A-48043**
- Antarctica: the construction of a continent by and for science [1993, eng] **A-48159**
- Hobart, Tasmania: antarctic and southern ocean connections [1993, eng] **A-48339**
- Antarctica: the last outpost of the honor system [1993, eng] **A-48398**
- Structure and dynamics of antarctic population [1993, eng] **A-48425**
- Antarctica: an international treasure [1991, eng] **A-48507**
- History of Granite House and the western geological party of Scott's *Terra Nova* expedition [1993, eng] **A-48730**
- History of antarctic science [1992, eng] **A-48851**
- South Africa in Antarctica and the Prince Edward Is. [1991, eng] **A-48884**
- Why explore Antarctica? Australian discussions in the 1880s [1992, eng] **A-49443**
- Antártida Argentina, Oct. 1992, No.18 [1992, spa] **A-49458**
- South Shetland Islands: the sealing cycle. 2 [1993, spa] **A-49460**
- South Shetland Islands: the sealing cycle. 1 [1993, spa] **A-49466**
- East Base Historic Monument. Stonington Island/Antarctic Peninsula [1993, eng] **A-49491**
- Antarctic fish and fisheries [1992, eng] **B-48088**
- History of recent South African marine research in the southern ocean [1991, eng] **B-48898**
- Environmental assessment of a whaling station on Deception I. [1992, eng] **B-49163**
- Cartography and toponymy [1992, spa] **C-48594**
- Antarctica. A human odyssey confirming a hypothesis [1992, cat] **C-48956**
- Proposals for the first Australian antarctic expedition [1990, eng] **D-47445**
- Prospects for the "Antarctic question" in the United Nations [1992, spa] **M-48569**
- Evolution of Antarctica in the 20th century [1992, spa] **M-48573**
- South Africa: the road to the Antarctic Treaty [1991, eng] **M-48892**
- Argentina, Chile, Great Britain and Antarctica in the 1940s [1992, spa] **M-49457**

Humidity

- Microclimate of the moss vegetation on King George I. [1992, chi] **B-48120**
- Physical variation of water vapor, and the relation with carbon dioxide [1992, eng] **I-47377**
- Analysis of the summer sea fog of Drake Passage [1992, chi] **I-47432**
- By radio from Antarctica [1991, rus] **I-47600**
- Denitrification of the 1990 antarctic spring stratosphere [1991, eng] **I-47732**
- Meteorological data, GvN Station, 1988-1991 [1992, eng] **I-47744**
- Five-year temperature and absolute humidity measurements at Terra Nova Bay [1992, eng] **I-47788**
- Climatology at Terra Nova Bay [1992, eng] **I-47791**
- Meteorological conditions near Elephant I. [1991, eng] **I-47872**
- Ozone and water vapor variations related to the solar diurnal tide [1993, eng] **I-48175**
- Moisture budget in the antarctic atmosphere [1992, eng] **I-48182**
- Stratospheric dryness: antiphased desiccation over Micronesia and Antarctica [1993, eng] **I-49127**
- Springtime stratospheric water vapour in the southern hemisphere as measured by MLS [1993, eng] **I-49128**
- Comparison of observed and modeled stratospheric water vapor [1993, eng] **I-49134**

Hydrography

- Research program in Antarctic Peninsula fjords, 1990 [1991, eng] **A-48359**
- New South African research programme in the southern ocean [1993, eng] **A-48802**

- Hydroacoustic observations of krill near Elephant I. [1991, eng] **B-47867**
- Nutrient distributions in the Weddell Sea [1991, eng] **B-48357**
- Diatom assemblages in Andvord Bay surface waters [1991, eng] **B-48361**
- Winter plankton assemblages at the Weddell and Scotia Seas ice edge [1993, eng] **B-48422**
- Unsaturated diether phospholipids in an antarctic methanogen [1992, eng] **B-48510**
- Distribution and overwintering strategies of 3 antarctic copepod species in the Weddell Sea [1993, eng] **B-48917**
- Sampling volatile organics from a meromictic antarctic lake [1993, eng] **B-48920**
- Spatial variability of antarctic krill in relation to mesoscale hydrography [1993, eng] **B-48958**
- Phytoplankton production and biomass in South Atlantic Ocean frontal zones [1993, eng] **B-49228**
- Calibration of an echo integration acoustic system with a standard sphere [1993, eng] **B-49370**
- Krill abundance, size and maturity in Subarea 48.1 in 1990-1991 [1993, eng] **B-49373**
- Krill distribution and population differences between penguin and fur seal foraging areas [1993, eng] **B-49379**
- Volcanic observations on Scott Island in the antarctic ocean [1992, eng] **E-47819**
- Heat and mass balances of the South Atlantic Ocean calculated from a numerical model [1993, eng] **J-47724**
- Late Eocene-Oligocene sedimentation and water circulation [1992, eng] **J-47766**
- South Indian Ocean Current [1992, eng] **J-47880**
- Effects of wind, density, and bathymetry on a one-layer Southern Ocean model [1992, eng] **J-47937**
- Weddell Gyre warm-pool characteristics [1991, eng] **J-48358**
- Vorticity constraints on southern ocean hydrography [1993, eng] **J-48373**
- Channel models of the Antarctic Circumpolar Current [1993, eng] **J-48502**
- Structure and transport of the Antarctic Circumpolar Current and Agulhas Return Current at 40E [1993, eng] **J-48680**
- Concentration and isotopic composition of Nd in the South Atlantic Ocean [1993, eng] **J-48844**
- Hydrological fronts of the southern ocean, summer 1988-1989 [1992, rus] **J-48875**
- Strait of Magellan physical oceanography [1991, eng] **J-49033**
- Dissolved oxygen and nutrients in the Straits of Magellan [1991, eng] **J-49034**
- Paleoenvironmental parameters of antarctic surface water in the Late Quaternary [1993, ger] **J-49104**
- Models of boundary value problems pertaining to the Weddell Sea [1990, eng] **J-49191**
- Primary productivity and nutrients in the Indian sector of the southern ocean [1992, eng] **J-49472**
- Hydrology**
- Limnology of saline lakes in Bunger Hills [1993, eng] **B-47902**
- Phosphorus load and eutrophication in Lake Vanda [1993, eng] **B-48645**
- Microbial communities and processes in antarctic flowing waters [1993, eng] **B-48753**
- Hydrology of Lake Glubokoye, King George I., winter 1987 [1991, rus] **E-47587**
- Late Permian Palaeogeography maintained a temperate Gondwanan climate [1993, eng] **E-47611**
- East and west temperature and conductivity differences of Lake Bonney [1991, eng] **E-47876**
- Geochemical evolution of terrestrial waters in the dry valleys [1993, eng] **E-48642**
- Metal transport and release processes in Lake Vanda [1993, eng] **E-48643**
- Hydrology and hydrochemistry of natural waters of East Antarctica [1992, rus] **E-48872**
- Physical hydrology of the dry valley lakes [1993, eng] **F-48636**
- Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991 [1991, eng] **J-47660**
- See also:* Limnology
- Hydromagnetic waves**
- See also:* Magnetohydrodynamic waves
- Hygiene**
- See also:* Sanitation; Waste disposal
- Ice**
- Preprints [1992, eng] **I-47940**
- Status of polar ice under international law [1992, eng] **M-48711**
- See also:* Firn; Frazil ice; Glacier ice; Ice sheet; Lake ice; Pack ice; Sea ice; Shelf ice
- ABLATION**
- Surface mass balance of the Antarctic Peninsula ice sheet [1992, eng] **F-49204**
- ACCUMULATION**
- Design of the new central building at Showa Station [1993, jpn] **G-48620**
- ALBEDO**
- Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6 [1992, eng] **F-48179**
- Evaluation of bi-hemispherical reflectance of antarctic surfaces [1992, eng] **I-47398**
- BREAKUP**
- Ice shelves on the Antarctic Peninsula: changing climate and sea level [1992, eng] **F-49209**
- Near breakup of the surface-flooded ice wharf at McMurdo Station, Antarctica [1992, eng] **G-47698**
- CHEMISTRY**
- Antifreeze glycopeptide adsorption on single crystal ice surfaces using ellipsometry [1993, eng] **B-48911**
- Hydrology and hydrochemistry of natural waters of East Antarctica [1992, rus] **E-48872**
- Sea salt dependent electrical conduction in polar ice [1992, eng] **F-47844**
- Measurement of helium isotopes in Vostok ice core [1993, fre] **F-48202**
- Nitrate signal of solar flares in polar snow and ice [1992, eng] **F-48429**
- Radar absorption due to impurities in antarctic ice [1993, eng] **F-48712**
- Cadmium concentration changes in antarctic ice and snow [1993, eng] **F-48842**
- Ronne Ice shelf core and textural evolution of deforming ice [1992, eng] **F-49068**
- Uptake of HNO₃ onto ice, NAT, and frozen sulfuric acid [1992, eng] **I-48303**
- Spectroscopic probe of model polar stratospheric cloud films [1993, eng] **I-48560**
- On the adsorption of NO and NO₂ on cold H₂O/H₂SO₄ surfaces [1993, eng] **I-49124**
- Uptake of HCl in water ice and nitric acid ice films [1993, eng] **I-49258**
- Isotopic pleiad of oxygen in atmospheric precipitation in the polar regions [1991, rus] **J-48101**
- CONSTRUCTION**
- Near breakup of the surface-flooded ice wharf at McMurdo Station, Antarctica [1992, eng] **G-47698**
- Construction of the Dumont d'Urville airfield [1990, fre] **G-48282**
- Polar engineering [1990, fre] **G-48283**
- Field survey of potential airstrip locations: Mt. Howe, Antarctica, 1991 [1991, eng] **G-48306**
- Use of the C-5 Galaxy in support of the United States Antarctic Program [1993, eng] **G-48937**
- Construction of ice domes at Asuka Station [1993, eng] **G-49336**
- CORES**
- Ice cores: a bibliography [1992, eng] **A-48272**
- Microorganisms in the antarctic ice [1993, eng] **B-48747**
- Shallow ice core drilling project at Byrd Station [1991, eng] **E-47992**
- "Taylor Ice-Dome" study: reconnaissance 1990-1991 [1991, eng] **F-47997**
- MSA and non-seasalt sulfate in the Vostok ice core [1991, eng] **F-48005**
- Development of laser ice-cutting apparatus [1991, eng] **F-48006**
- Oxygen isotope study of ice fields in East Antarctica [1992, eng] **F-48124**
- Measurement of helium isotopes in Vostok ice core [1993, fre] **F-48202**
- Ice core record for past and future climate studies [1992, eng] **F-48261**
- Core drilling by electromechanical drill [1993, eng] **F-48732**
- Cadmium concentration changes in antarctic ice and snow [1993, eng] **F-48842**
- Glaciological measurements on the south Ronne Ice Shelf [1991, eng] **F-48991**

Ice

CORES *(cont.)*

- Global changes in the environment as “mirrored” in an ice core [1992, rus] **I-47425**
- General circulation model under ice age conditions [1993, eng] **I-48083**
- Atmospheric CO₂ content and North Atlantic Pleistocene climate [1993, eng] **I-49448**

CRYSTALS

- Antifreeze glycopeptide adsorption on single crystal ice surfaces using ellipsometry [1993, eng] **B-48911**
- Structural characteristics and development of sea ice in the western Ross Sea [1993, eng] **F-47904**
- Ecological environmental features of antarctic sea ice and its role in the marine ecosystems [1993, chi] **F-48767**
- Ronne Ice shelf core and textural evolution of deforming ice [1992, eng] **F-49068**

DEFORMATION

- Characteristics of the spatial structure of subsurface ice in the vicinity of Vostok Station, Antarctica [1991, rus] **F-48103**
- Ronne Ice shelf core and textural evolution of deforming ice [1992, eng] **F-49068**
- Construction of ice domes at Asuka Station [1993, eng] **G-49336**

DRILLING

- Core drilling by electromechanical drill [1993, eng] **F-48732**

EXPLOITATION

- Uses of antarctic ice [1992, spa] **M-48589**

FLOW

- Digital photogrammetric approach to ice-flow determination in Antarctica [1992, eng] **F-48525**
- Ice shelves and icebergs—an overview [1989, eng] **F-49496**

FORMATION

- Ronne Ice shelf core and textural evolution of deforming ice [1992, eng] **F-49068**
- Ice clouds in the antarctic stratosphere: evidence for water removal [1992, eng] **I-47409**
- Freezing points of H₂SO₄ aqueous solutions and formation of stratospheric ice clouds [1993, eng] **I-48379**

HEAT EXCHANGE

- Energy-balance and surface layer measurements in Antarctica [1992, eng] **I-47404**

INSTRUMENTS

- Antifreeze glycopeptide adsorption on single crystal ice surfaces using ellipsometry [1993, eng] **B-48911**
- Polarization characteristics of natural thermal emission from antarctic sea ice [1991, rus] **F-47588**
- Development of laser ice-cutting apparatus [1991, eng] **F-48006**
- Seismic characteristics of an airgun fired over snow [1993, eng] **F-48049**
- Microwave signature of firn and sea ice from airborne observations [1992, eng] **F-48181**
- Sea ice altimetry [1992, eng] **F-48192**
- Remote sensing of sea-ice thickness in the Weddell Sea [1991, eng] **F-48353**
- Core drilling by electromechanical drill [1993, eng] **F-48732**
- Direct oceanographic observations from under the Rutford flowline, Ronne Ice Shelf [1991, eng] **F-48989**
- Ice drift in the Weddell Sea in 1990-1991 as tracked by a satellite buoy [1993, eng] **F-49058**
- Oceanographic measurements under Ronne Ice Shelf [1992, eng] **F-49071**
- ERS-1 altimeter tests on Filchner-Ronne Ice Shelf [1992, eng] **F-49080**
- Radar soundings of the Bailey Ice Stream [1992, eng] **F-49081**
- Studies through Jutulgryta, Fimbulisen in the 1991/92 season [1992, eng] **F-49083**
- Delving into the west antarctic ice sheet [1993, eng] **F-49188**
- New views for antarctic glaciology [1993, eng] **F-49189**

MAPS AND CHARTS

- Analysis of ERS-1 altimeter data over polar ice sheets [1993, eng] **C-48649**
- Feature maps of ice streams C, D, and E, West Antarctica [1991, eng] **C-48787**
- Advances in antarctic surveying and mapping [1991, eng] **C-48788**
- Antarctic drifting sea ice atlas for areas restricted from 0 to 90 west longitude [1993, eng] **C-48944**
- Glacial history of the Ellsworth Mountains [1992, eng] **E-48078**
- Late Pleistocene ice sheet grounding in the Ross Sea [1992, eng] **E-48126**

- Glacial history of the Antarctic Peninsula's continental shelf [1992, eng] **E-48127**

- Safety in ice navigation in antarctic waters [1992, eng] **F-47695**

- Analysis of radar studies on the Siple Coast [1991, eng] **F-47993**

- Oxygen isotope study of ice fields in East Antarctica [1992, eng] **F-48124**

- Microwave remote sensing of sea ice [1992, eng] **F-48189**

- Introduction to “Microwave Remote Sensing of Sea Ice” [1992, eng] **F-48190**

- Considerations for microwave remote sensing of thin sea ice [1992, eng] **F-48194**

- Microwave remote sensing of polynyas [1992, eng] **F-48195**

- Southern ocean sea-ice distributions and extents [1992, eng] **F-48263**

- Evidence for an antarctic winter coastal polynya [1993, eng] **F-48444**

- Some results of the derivation of ice sheet elevations in Antarctica from ERS-1 altimeter data [1993, eng] **F-48650**

- Utilisation of ERS-1 data for mapping of Antarctica [1993, eng] **F-48651**

- Monitoring the dynamics of the antarctic coastline with Landsat images [1991, eng] **F-48789**

- Digital coastline of Filchner-Ronne-Schelfeis: interpretation of high quality satellite imagery [1991, eng] **F-48985**

- Thematic maps of Filchner-Ronne Ice Shelf [1991, eng] **F-48986**

- Densely spaced radar altimeter coverage of antarctic ice shelves [1991, eng] **F-48994**

- Strain and velocity determination on Ronne Ice Shelf [1992, eng] **F-49074**

- ERS-1 radar altimetry of the Filchner-Ronne Ice Shelf [1992, eng] **F-49078**

- Use of visible satellite imagery over ice sheets [1992, eng] **F-49222**

- Navigation in the Weddell and Bellingshausen seas [1993, eng] **G-48942**

- Katabatic surges across the Ross Ice Shelf [1992, eng] **I-47943**

MODELS

- Glacial history of the Ellsworth Mountains [1992, eng] **E-48078**

- Late Pleistocene ice sheet grounding in the Ross Sea [1992, eng] **E-48126**

- Sea ice and atmospheric forcing interacting models [1992, eng] **F-47706**

- How unstable is the west antarctic ice sheet [1992, eng] **F-47718**

- Interactive atmospheric surface-layer modifications for a large-scale sea-ice model [1992, eng] **F-47945**

- Investigation of antarctic sea ice concentration [1992, eng] **F-48096**

- Analysis of gravity measurements on the Ross Ice Shelf, Antarctica [1992, eng] **F-48129**

- Equilibrium climate model and high latitude glaciation [1990, eng] **F-48136**

- Microwave remote sensing of sea ice [1992, eng] **F-48189**

- Introduction to “Microwave Remote Sensing of Sea Ice” [1992, eng] **F-48190**

- Physical properties of sea ice relevant to remote sensing [1992, eng] **F-48191**

- Sea ice altimetry [1992, eng] **F-48192**

- Response of large ice sheets to climatic change [1992, eng] **F-48262**

- Mass balance variations on Filchner-Ronne Ice Shelf [1990, eng] **F-48389**

- One method of analyzing the interdependence of short time series [1990, rus] **F-48390**

- Radar absorption due to impurities in antarctic ice [1993, eng] **F-48712**

- Glacier flow modeling [1993, eng] **F-48848**

- Ice shelf basal melting: implications of a simple mathematical model [1991, eng] **F-48990**

- Coupled ocean and sea-ice models: review and perspectives [1989, eng] **F-49057**

- New results of structural investigations in the central part of the FRIS [1992, eng] **F-49066**

- Ronne Ice shelf core and textural evolution of deforming ice [1992, eng] **F-49068**

- ERS-1 altimeter tests on Filchner-Ronne Ice Shelf [1992, eng] **F-49080**

- Ecology Glacier glaciology and meteorology, King George I., 1990-1991 [1992, eng] **F-49162**

- Estimating ice-sheet response to climate change [1992, eng] **F-49208**
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Used as subordinate term under various types of ice (snow)

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- Used as subordinate term under Aurora and various types of animals (plants) and ice (snow)*

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- See: Bryophyta-Musci*

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See: Power/Nuclear

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See: Aerosols

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- Marine productivity around Bouvet and the South Sandwich Is. [1992, eng] **J-47603**
- Antarctic Project: oceanography. Collection of publications Jan. 1986-July 1991 [1991, eng] **J-47660**
- Phytoplankton distribution and environmental factors in Terra Nova Bay [1991, ita] **J-47661**
- Oceanography of Transect 47W [1991, eng] **J-47662**
- Late Eocene-Oligocene sedimentation and water circulation [1992, eng] **J-47766**
- Particle flux and productivity in Andvord Bay [1992, eng] **J-48026**
- Significance of Pa-231/Th-230 ratios in southern ocean sediments [1993, eng] **J-48030**
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- Bacterioplankton growth in McMurdo Sound [1991, eng] **B-47527**

- Massive prasinophyte bloom in northern Gerlache Strait [1991, eng] **B-47531**

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- Biogeography of Campanian-Maastrichtian calcareous plankton [1992, eng] **E-47758**
- Paleogene chronology of southern ocean drill holes: an update [1992, eng] **E-47760**
- Late Neogene Polar Front migration [1992, eng] **E-47975**

- Global implications of the antarctic Cretaceous-Tertiary boundary transition [1993, eng] **E-48471**
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- Biology of *Euplotes focardii*, an antarctic ciliate [1993, eng] **B-49230**
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- Benthic foraminiferal assemblages 35 to 57S, South Atlantic Ocean [1993, eng] **B-48857**
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- Upper Cretaceous benthic foraminifers from the Kerguelen Plateau [1992, eng] **E-47985**
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- Late Cretaceous dinoflagellate cysts from the Kerguelen Plateau [1992, eng] **E-47982**
- Upper Cretaceous planktic foraminiferal biozonation for the Austral Realm [1992, eng] **E-48091**
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- Radiolarian taxa from South Atlantic Ocean sediments [1992, eng] **B-47473**
- Test morphogenesis and bioadhesives in a giant antarctic foraminifer [1991, eng] **B-47537**
- New antarctic marine species of *Euplotes* [1991, eng] **B-47647**
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- Antarctic entoprocta [1993, eng] **B-48719**
- Pseudopodia role in prey capture of *Astrammmina rara* [1992, eng] **B-48954**
- Structural and mechanical properties of *Astrammmina rara* test [1993, eng] **B-48955**
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- Pseudopodia role in prey capture of *Astrammmina rara* [1992, eng] **B-48954**
- PATHOLOGY**
- Tolerance of antarctic foraminifera to anoxia and H₂S [1993, eng] **B-48173**
- PHYSIOLOGY**
- Southern ocean microbial food web study by microcosm experiments [1992, eng] **B-47452**
- Experiments on effects of sea ice biota on seeding [1992, eng] **B-47469**
- Test morphogenesis and bioadhesives in a giant antarctic foraminifer [1991, eng] **B-47537**
- Pseudopodia role in prey capture of *Astrammmina rara* [1992, eng] **B-48954**
- Structural and mechanical properties of *Astrammmina rara* test [1993, eng] **B-48955**
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- Protist abundance during algal bloom in Prydz Bay [1992, eng] **B-47474**
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- Coastal phytoplankton biomass and the iron limitation theory [1993, eng] **B-48402**
- Abundance and biomass distribution of microbial assemblages in surface waters [1993, eng] **B-48602**
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- Going to extremes: the cultural context of stress, illness and coping in Antarctica [1992, eng] **H-48461**
- Systemic study of a wintering group on Kerguelen Is. [1991, fre] **H-48821**
- Selection and management of British antarctic personnel for prolonged service in Antarctica [1993, eng] **H-48926**
- Medical and health aspects of the Italian antarctic programme [1993, eng] **H-48927**
- Changing the dynamics of antarctic communities [1993, eng] **H-48928**
- See [also]:* Interpersonal relationships; Isolation effects; Light and darkness effects
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- Reconstructing the Gondwana seed fern *Dicroidium* [1992, eng] **E-47420**
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- Reproductive biology of Permian Glossopteridales [1992, eng] **E-47746**
- Publications**
- Contribution of SCAR to antarctic research [1992, eng] **A-47519**
- Antarctic journal of the United States, vol.28, no.2 [1993, eng] **A-49184**
- Impact of BIOMASS-related research on South African antarctic science [1991, eng] **B-48900**
- Reports of the national contributions to the BIOMASS program [1992, eng] **B-49135**
- Argentine contributions to BIOMASS [1992, eng] **B-49136**
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- Spectral irradiance in dry valley lakes [1992, eng] **B-48123**
- Radioelements in the sedimentary sequence of the Ellsworth Mountains [1992, eng] **E-48072**
- Proceedings of the NIPR Symposium on Polar Meteorology and Glaciology, No.6 [1992, eng] **F-48179**
- Ecology Glacier glaciology and meteorology, King George I., 1990-1991 [1992, eng] **F-49162**
- Backscattering lidar cloud observations at Dumont d'Urville [1992, eng] **I-47787**
- Climatic atmospheric outflow at the continental margin [1992, eng] **I-47812**
- Preprints [1992, eng] **I-47940**
- Multifractal cloud properties data assessment [1992, eng] **I-48431**
- GRAD observes supernova during a balloon flight over Antarctica [1993, eng] **K-47709**
- Also used as subordinate term under various types of ice (snow)*
- ATMOSPHERIC**
- Atmospheric longwave radiation spectrum on the antarctic plateau [1992, eng] **I-47942**
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- Energy resource of winter season in Siberia and polar areas [1992, eng] **I-47653**
- Polar cloudiness: some results from ISCCP and other cloud climatologies [1992, eng] **I-47941**
- Radiometric profiles of antarctic winter clouds [1993, eng] **I-49045**
- Radiative feedback of polar stratospheric clouds on antarctic temperatures [1993, eng] **I-49125**
- 1990 antarctic surface energy balance components, Zhongshan Station [1993, eng] **I-49452**
- GCM study of antarctic glaciation [1989, eng] **I-49494**

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- Kr-81 terrestrial ages and grouping of Yamato eucrites [1993, eng] **E-48453**
- Antarctic polymict eucrite Yamato 792769 and the cratering record on the HED parent body [1993, eng] **E-48462**
- Noble gases and Kr-81 terrestrial age of Asuka 881757 lunar meteorite [1993, eng] **E-48689**
- Noble gases in the unique meteorites Yamato-74063 and -74357 [1993, eng] **E-48692**
- C-14 terrestrial ages of nine antarctic meteorites using CO and CO₂ temperature extractions [1993, eng] **E-48706**
- H-chondrite flux over the last million years [1993, eng] **E-49490**
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- OASI Observatory in Antarctica [1991, eng] **K-47727**
- Cosmic ray laboratory (LARC) [1992, eng] **K-47798**
- Measurements of the cosmic microwave background temperature at 1.47 GHz [1991, eng] **K-48430**
- Differential radiometer for mm wavelengths [1992, eng] **K-48452**
- Long-wavelength spectrum of the cosmic microwave background [1991, eng] **K-48776**
- Long-duration antarctic balloon flight using emulsion chamber cosmic-ray detectors [1991, eng] **K-48785**
- Ducted whistlers and the burst loss of radiation-belt electrons to geomagnetically conjugate ionospheric regions [1991, eng] **K-48786**
- Exploring geospace and the heliosphere by cosmic rays [1991, eng] **K-48897**
- Further radiation anisotropy data from the South Pole [1993, eng] **K-49437**

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- New evidence for geomagnetically trapped anomalous cosmic rays [1993, eng] **K-49317**

SOLAR

- Antarctic Journal of the United States, Vol.27, No.4 [1992, eng] **A-47604**
- Polar news/Notizie polari, Vol.8, No.6 [1993, ita] **A-49455**
- UV-B radiation effect on subantarctic lake phytoplankton [1992, eng] **B-47501**
- Impact of natural UVR on photosynthesis rates in phytoplankton [1992, eng] **B-47703**
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- Plant and invertebrate response to climatic changes [1992, eng] **B-48267**
- Ozone depletion and UV-B radiation in the Antarctic—limitations to ecological assessment [1992, eng] **B-48662**
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- Analysis of infrared imagery over the Ronne Ice Shelf [1992, eng] **F-49077**
- Late Pleistocene variations in antarctic sea ice. 1. Effect of orbital insolation changes [1988, eng] **F-49492**
- Use of renewable energy in selected antarctic applications [1993, eng] **G-49090**
- Analysis of antarctic data, Feb. 1987-Aug. 1990 [1992, eng] **I-47388**
- Atmospheric turbidity parameters at Terra Nova Bay in Jan. 1990 [1992, eng] **I-47396**
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- Ozone absorption and sun-photometric measurements [1992, eng] **I-47406**
- Atmospheric radiation regime at Russkaya Station [1991, rus] **I-47585**
- Energy resource of winter season in Siberia and polar areas [1992, eng] **I-47653**
- Climatic parameters and ground-level ozone at Terra Nova Bay [1991, eng] **I-47730**

- Evaluation of surface turbulent fluxes at Camp Icaro [1992, eng] **I-47793**
- Total ozone measurements with Dobson and Brewer spectrophotometers [1992, eng] **I-47813**
- Ultraviolet radiation at McMurdo Station during the 1990 ozone hole [1992, eng] **I-48147**
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- Visible/near-ultraviolet spectroscopy at McMurdo Station, pt.9 [1993, eng] **I-48469**
- Increased transmission of ultraviolet radiation to the surface due to stratospheric scattering [1993, eng] **I-48470**
- Polar day/night radiation at Zhongshan Station [1993, eng] **I-48473**
- Katabatic flow thermodynamics of Adélie Coast [1993, eng] **I-48559**
- Halogen Occultation Experiment [1993, eng] **I-48562**
- Atmospheric NO₃. 4. Vertical profiles at middle and polar latitudes at sunrise [1993, eng] **I-48624**
- Solar ultraviolet irradiance observed from southern Argentina: September 1990 to March 1991 [1993, eng] **I-48646**
- Radiation characteristics at Mizuho Station [1993, chi] **I-48771**
- Availability of photosynthetically active radiation in Antarctica [1993, eng] **I-48855**
- Penetration of PAR, UV-a and UV-b in Admiralty Bay [1992, eng] **I-49161**
- Effect of decreased solar luminosity on Late Precambrian ice extent [1993, eng] **I-49253**
- JARE-31 meteorological observations at Showa and Asuka stations in 1990 [1993, jpn] **I-49337**
- Meteorological observations [1992, eng] **I-49392**
- Comparative antarctic ozone spectrophotometry [1993, eng] **I-49444**
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- Communications and the antarctic network [1993, eng] **A-48947**
- Orbiting satellites and ground based telecommunication system at King Sejong Station [1992, kor] **G-48168**
- Symposium on Antarctic Logistics and Operations, 5th. Proceedings [1993, eng] **G-48921**
- Vehicles and transports during the Swedish Antarctic Research Programme 1991/92 [1993, eng] **G-48940**
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- Collection, processing and transmitting of aerometeorological data [1991, rus] **I-47586**
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- Radioelements in the sedimentary sequence of the Ellsworth Mountains [1992, eng] **E-48072**
 Atmospheric physics and chemistry of Adélie Coast [1990, fre] **I-48278**

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 Atmospheric water-vapour transport to Antarctica inferred from radiosonde data [1993, eng] **I-48090**

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- Structure and dynamics of antarctic population [1993, eng] **A-48425**
 JARE-32 activities at Asuka Station in winter 1991 [1993, jpn] **A-48619**
 Concise review of antarctic fish research in South Africa [1991, eng] **A-48891**
 Korean (KORDI) annual report, 1992 [1992, eng] **A-49468**
 Long-term ecological research strategy for polar environmental research [1992, eng] **B-48663**
 Architecture in Antarctica [1992, spa] **G-47927**
 Twelve years as master of the *SA Agulhas* [1991, eng] **G-48896**
 Vehicles and transports during the Swedish Antarctic Research Programme 1991/92 [1993, eng] **G-48940**
 Transport concept at the antarctic stations and for field operations of the Alfred Wegener Institute [1993, eng] **G-48941**
 Performance of the *Nathaniel B. Palmer* in ice [1993, eng] **G-48943**
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 Cosmic ray laboratory (LARC) [1992, eng] **K-47798**

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- Antarctic support operations, 1990-1991 [1991, eng] **A-48793**

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- Reports of the national contributions to the BIOMASS program [1992, eng] **B-49135**
 Argentine contributions to BIOMASS [1992, eng] **B-49136**

Australian National Antarctic Research Expeditions

- Organisation and funding of the Australian antarctic program [1993, eng] **A-48731**

British Antarctic Survey

- Information sources used by antarctic scientists [1992, eng] **A-47522**
 British Antarctic Survey report for 1991-1992 [1992, eng] **A-48021**
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 Customised digital maps of Antarctica [1993, eng] **C-49485**
 Selection and management of British antarctic personnel for prolonged service in Antarctica [1993, eng] **H-48926**

Co-operative Research Centre

- Antarctica—the last frontier for climate modelling [1992, eng] **A-48032**

Korea Ocean Research and Development Institute

- Korean (KORDI) annual report, 1992 [1992, eng] **A-49468**

National Institute of Polar Research

- Overview of the National Institute of Polar Research '92 [1992, jpn] **A-48371**

National Science Foundation

- Fuel spill response contingency planning process [1993, eng] **B-48935**

Scientific Committee on Antarctic Research

- Contribution of SCAR to antarctic research [1992, eng] **A-47519**
 SCAR report No.9, Aug. 1992 [1992, eng] **A-47960**
 Future of antarctic scientific research [1993, eng] **A-48012**
 SCAR bulletin No.108, January 1993 [1993, eng] **A-48013**

South African National Committee for SCAR

- South African National Committee for SCAR [1991, eng] **A-48888**

U.S. National Science Foundation

- NSF's role in polar information [1992, eng] **A-47521**
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U.S. Naval Support Force Antarctica

- U.S. Navy support activities, 1990-1991 [1991, eng] **A-48792**

Research programs

- Antarctic, Vol.12, No.6 [1991, eng] **A-47504**
 Polar news/Notizie polari, Vol.7, No.10 [1992, ita] **A-47918**
 Future of antarctic scientific research [1993, eng] **A-48012**
 SCAR bulletin No.108, January 1993 [1993, eng] **A-48013**
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See also: Tectonics

Structure

See under: Atmosphere. *Also used as subordinate term under various types of ice (snow)*

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Used as subordinate term under various types of ice (snow)

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Sudden warming

See under: Stratosphere

Sunspots

See under: Solar activity

Supply

See: Food supply; Logistics; Transportation

Surface features

Used as subordinate term under various types of ice (snow)

Surveys

See under: Geomagnetic field. *See also:* Geodetic survey; Seismic exploration; Topographic survey

Survival

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See: Sea water/Suspensions

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See: Conferences

Taxonomy

Used as subordinate term under various types of animals (plants)

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See also: Crustal studies; Mantle studies; Structural geology

Temperature

See: Low temperature effects; Sea water/Thermal properties; Stratosphere/Sudden warming. *Also used as subordinate term under Atmosphere; Meltwater; Ocean; Upper aid and various types of ice (snow)*

Terns

See: Aves-Charadriiformes

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See: Vermes

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See: Thallophyta-Fungi

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